

EXAMINING THE INFLUENCE OF FRAMES OF REFERENCE  
ON FLIGHT INSTRUCTORS' PROCESS OF INFORMAL LEARNING  
IN AN AVIATION SETTING

BY

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DISSERTATION

Submitted in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy in Human Resource Education  
with a concentration in Human Resource Development  
in the Graduate College of the  
University of Illinois at Urbana-Champaign, 2011

Urbana, Illinois

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## **Abstract**

Informal learning in the workplace is one of the most predominant forms of learning and is critical to the development of professional knowledge and expertise. Several scholars have acknowledged the need to develop more holistic understandings of informal learning and undertake more research that examines how certain characteristics of workers and their work environment influence engagement in informal learning. Individual learning includes the collective experience of the individual in his or her development as a person as well as in his or her learning. This learning is situated within a dynamic field or context that influences the learner. Scholars have indicated that the informal learning process is mediated by an individual's frame of reference. This suggests, that, depending upon how one frames a situation or environment, this framing may influence the choices and decisions one makes. Yet, how frames of reference actually influence the process of informal learning remains underdeveloped in the literature. Therefore, the purpose of this study was to examine the influence of frames of reference on informal learning in a unique work environment using a qualitative instrumental case study approach. Marsick, Watkins, Callahan, and Volpe's (2006) Informal and Incidental Learning Model underpinned this study as the theoretical framework. To examine the influence of individual frames of reference on the informal learning process, this qualitative case study first identified individual frames of reference. It then examined informal learning episodes from a workplace setting to ascertain the influence of individual frames of reference on the informal learning process. The findings of this study demonstrate the complex, cyclical, non-sequential nature of informal learning while highlighting the significance of problem variation in stimulating informal learning episodes. Further, the findings of this study illustrate the influence

of frames of reference on the informal learning process for flight instructors as these instructors encountered daily challenges associated with facilitating their students' learning in an aviation training setting.

## **Acknowledgments**

This project would not have been possible without the support of many people. I especially appreciate the support and direction of my adviser, Andrea D. Ellinger, who provided guidance and encouragement along the way. Her persistent quest for high quality and vision for the potential of this project spurred me to greater depths of discovery. To my committee members, who have challenged and mentored me through this process, my thanks to Liora Bresler, Scott Johnson, Peter Kuchinke, and Karen E. Watkins. I am thankful to the faculty and staff of University of Illinois, College of Education, for their support and depth of insight during my time in this program. Finally, I would like to express my heart felt thanks to my wife, children, colleagues, and numerous friends who endured this process with me, always offering support and love.

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## **Chapter 1**

### **Background of the Problem**

Much has been written in the past 30 years about the importance of individual learning and its impact on organizations (Cangelosi & Dill, 1965; Huber, 1991; Marsick, 2009; Molina & Callahan, 2009), on groups within the organization (Boud & Middleton, 2003; Brown, & Dugid, 1991; Cegarra-Navarro & Rodrigo-Moya, 2005; Kim, 1993) and on the individuals themselves (Dewey, 1938; Ellinger, 2005; Huber, 1991; Kim, 1993; Marsick, 2009). More recent literature has emphasized the importance of learning as a means of developing competitive advantage for organizations (Ellinger & Bostrom, 2002; Stata, 1989; Weldy, 2009), enhancing employee satisfaction (Marsick & Watkins, 1990), fostering innovation (Brown, & Dugid, 1991; Nonaka, 1994; Stata, 1989), as well as other beneficial returns for the individual, the organization, and society.

One particular aspect of individual learning within the organization that has become the focus of considerable attention and research is informal learning (Ellinger, 2005; Marsick, 2009; Marsick & Watkins, 1990; Marsick, Watkins, Callahan, & Volpe, 2006). Research suggests that informal learning is the predominant form of learning that occurs among adults, particularly in the workplace (Boud & Garrick, 1999; Brockman & Dirkx, 2006; Jarvis, 2006; Marsick & Watkins, 1990). Considering the prevalence and importance of informal learning, scholars have indicated that it is necessary to move towards a holistic understanding of this form of learning (Boud & Garrick, 1999; Ellinger & Cseh, 2007; Hodkinson & Hodkinson, 2003; Marsick & Watkins, 2001).



Scholars have acknowledged that individuals learn on a continual basis through their daily experience and interaction in their environment (Dewey, 1938; Jarvis, 2006; Kolb, 1984; Marsick, 2009; Owen, 2009). This learning may take many forms but in most cases it is informal or incidental learning (Lohman & Woolf, 2001; Marsick, 2009; Marsick & Watkins, 1990; Merriam, Caffarella, & Baumgartner, 2007). Informal learning has been found to affect the individual's understanding and frame of reference in engaging with the world around him or herself. Further, such learning affects how an individual will respond to new experiences in his or her daily life (Dewey, 1938; Jarvis, 2006; Kolb, 1984; Marsick & Watkins, 1990). Informal learning is embedded in experiential learning as part of one's daily life (Jarvis, 2006; Marsick, 2009; Marsick & Watkins, 1990).

Dewey (1938) and others have informed our understanding of the place of experience in learning (Boud & Garrick, 1999; Eraut, 2004; Jarvis, 2006; Kolb, 1984; Marsick, 2009; Marsick & Watkins, 1990; Owen, 2009). Scholars contend that individual learning is more than the acquisition of a collection of facts that are remembered, but includes the collective experience of the individual in his or her development as a person as well as in his or her learning (Dewey, 1938; Ellinger & Cseh, 2007; Jarvis, 2006; Kolb, 1984; Marsick, 2009; Owen, 2009).

Experiential learning may be seen as a part of the developmental process. As individuals encounter various experiences, they are challenged to make sense of the experience, or to resolve a problem presented by the experience (Brockman & Dirkx, 2006; Jarvis, 2006; Marsick, 2009). Experiential learning is also situated in, and influenced by, the various factors that are present in an individual's social, cultural, and historical settings (Cseh, Watkins & Marsick, 1999; Cole,

1996; Ellinger, 2005; Marsick et al., 2006; Jurasaitė-Harbison, 2009; Marsick, 2009; Wertsch, 1990).

Each individual has distinct experiences that form his or her life history shaping his or her environment of which he or she is an integral part (Boud & Middleton, 2003; Boud & Solomon, 2003; Merriam & Caffarella, 1999; Merriam, Caffarella, & Baumgartner, 2007; Merriam & Mohamad, 2000). Individuals build expectations from an experience gained in a given context. How they interpret that experience governs their learning and expectations of future experiences (Cseh et al., 1999; Dewey, 1938; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Kolb, 1984; Lewin, 1974; Marsick, 2009). Learning is influenced and interwoven with the various factors that form the context or environment of the individual (Jurasaitė-Harbison, 2009; Lewin, 1974; Owen, 2009).

Lewin (1974) identified the collective of these factors as the *Field*. The field (Lewin, 1974), environment (Jarvis, 2006), or context (Cole, 1996; Ellinger, 2005; Marsick & Watkins, 1990) is the cross section of all the spheres that involve the individual. The field is both influencing and being influenced by the individual in a reciprocal process described as a dynamic field (Marsick, 2009). The field or context consists of social, cultural, and historical factors embedded in a specific time and physical environment (Cole, 1996; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Jurasaitė-Harbison, 2009; Lewin, 1974; Marsick, 2009; Marsick & Watkins, 1990; Rogoff, 2003; Wertsch, 1990; Vygotsky, 1978). The field represents the totality of all the factors: physical, psychological, social, cultural, historical, transcendental, and emotional, which intersect with individuals, forming who they are as beings in the world (Cole, 1996; Jarvis, 2006; Lewin, 1974; Marsick, 2009; van Manen, 1990; Vygotsky, 1978). Each individual is a part of

and influenced by a dynamic field or context, which as an influential factor poses implications for individual informal learning (Cseh et al., 1999a, 1999b; Ellinger, 2005; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Jurasaitė-Harbison, 2009).

Informal and incidental learning may be structured or unstructured, unintended and incidental, or part of a planned activity. Informal learning is under the control of the learner (Boud & Garrick, 1999; Jarvis, 2006; Marsick & Watkins, 1990). Additionally, informal and incidental learning may occur on or off the job because it is embedded in an individual's daily experience. This extends the boundaries of the learning environment for each individual according to the dynamic nature of individual context (Evans & Kersh, 2004; Lewin, 1974). Scholars have engaged in research that examines how individuals learn informally (Boud & Garrick, 1999; Boud & Middleton, 2003; Jarvis, 2006; Marsick, 2009; Marsick & Watkins, 1990). According to Marsick and Watkins' (1990) Informal and Incidental Learning Model, the learning process commences with a trigger or some event or situation that challenges an individual's presently held frame of reference requiring a non-routine response (Cseh et al., 1999; Ellinger & Cseh, 2007; Marsick, 2009; Marsick & Watkins, 1990; Marsick et al., 2006). According to Cseh et al. (1999) the entire informal learning process is predicated on the individual's frame of reference which suggests that, depending upon how one frames a situation or environment, this framing may influence the process of informal learning (Anderson, 2005; Cheetham & Chivers, 2001b; Gola, 2009; Hodkinson & Hodkinson, 2003; Jarvis, 2006).

The literature provides some understanding about the complex tapestry of experience, emotion, social environment, and norms as they converge to form an individual's frame of reference of the world in which he or she lives. Scholars agree that one's frame of reference is a

key element in the learning process (Boud & Garrick, 1999; Boud & Solomon, 2003; Cseh et al., 1999; Hoekstra, Korthagen, Brekelmans, Beijaard, & Imants, 2009; Jarvis, 2006; Kolb, 1984; Mezirow, 2000). Mezirow (2000) suggests that, "...a frame of reference is a meaning perspective, the structure of assumptions and expectations through which we filter sense impressions (p. 16)..." He acknowledged that, "...it involves cognitive, affective, and conative dimensions. It selectively shapes and delimits perception, cognition, feelings and disposition by predisposing our intentions, expectations, and purposes (p.16)..." One's frame of reference is based on previous experience, the expectation of the future, and how one perceives the field or context at present (Jarvis, 2006; Mezirow, 2000). Frames of reference shape foundational understanding of problems, environmental conditions, and situations that individuals encounter as a part of daily life (Cseh et al., 1999; Jarvis, 2006; Marsick, 2009; Mezirow, 2000; Senge, 1990; 2006). It is one's perception that forms reality for the individual and by which he or she frames his or her world, rather than that which actually exists (Hoekstra et al., 2009; Jarvis, 2006).

### **Statement of Problem**

Individuals engage in informal learning, through the lived experience of their daily lives, as they encounter problems and challenges to their expectations which are based on their individual frames of reference (Boud & Garrick, 1999; Dewey, 1938; Kolb, 1984; Marsick, 2009; Marsick & Watkins, 1990; McNally, Blake, & Reid, 2009; Mezirow, 2000). Learning is situated within context, not only in a given situation, but in relationship to the entire field of influences interwoven in one's life of sociocultural development (Cseh et al., 1999; Cole, 1996; Dewey, 1938; Ellinger, 2005; Jarvis, 2006; Jurasaitė-Harbison, 2009; Lewin, 1974; Marsick,

2009; Mezirow, 2000). The implications of a dynamic, rather than a static field, raise serious considerations for research on informal learning. As one investigates a phenomenon in a given place and time, the observation reflects only that particular time within the specific context, conditions, attitudes, and behaviors of the moment, resulting in a limited view (Ellinger, 2005; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Lewin, 1974). Much of the research on informal and incidental learning has been limited by specificity of time, location, and context. Additionally, it appears that context has been broadly used to reflect specific boundaries such as school, the workplace, and home (Boud & Middleton, 2003; Ellinger, 2005; Lohman, 2006; Marsick et al., 2006). These artificial boundaries are inadequate for articulating the complexity of human learning and development and might be reconfigured as an expression of the sociocultural, historical, and environmental facets that shape individual frames of reference (Cole, 1996; Eraut, 2004; Lewin, 1974; Jurasaitė-Harbison, 2009; Marsick, 2009; Wertsch, 1990).

To understand various aspects of informal and incidental learning, scholars have indicated a need to consider the factors that influence this learning (Ellinger, 2005; Hoekstra et al., 2009; Marsick et al., 2006; Owen, 2009; Wertsch, 1990). Despite the prevalence of informal learning in the workplace, and the importance of context as it intersects with the development of individual frames of reference, little research has addressed how individual frames of reference influence the process of informal and incidental learning (Hodkinson & Hodkinson, 2003).

### **Purpose of the Study**

The purpose of this study was to examine the influence of frames of reference on the informal learning process. In support of this purpose, this study identified individual frames of

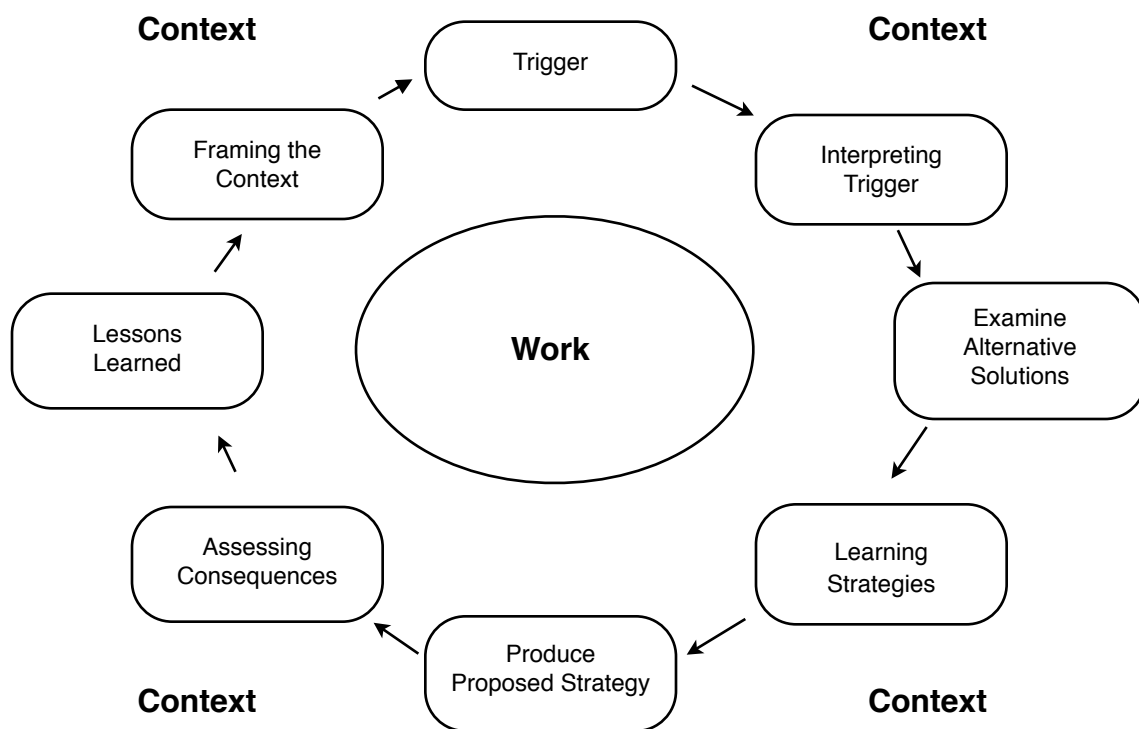
reference. This study then examined how individuals interpreted the challenges they met in their daily work experience as triggers to an informal learning process. Finally, these learning episodes were examined to ascertain the influence of individual frames of reference on the informal learning process.

### **Theoretical Framework**

The Marsick, Watkins, Callahan, and Volpe (2006) Informal and Incidental Learning Model provided a robust and tested theoretical framework to examine the influence of individual frames of reference on the informal learning process in the workplace (Cseh et al., 1999; Marsick & Watkins, 1990; Marsick et al., 2006). This Informal and Incidental Learning Model incorporates eight phases. The informal learning process commences with some trigger, which is instigated by a situation or an event that provides a disjuncture for the individual (Jarvis, 2006). The process continues through phases of the informal learning process that incorporate the individual interpreting the experience, considering alternative solutions and identifying learning strategies appropriate to the chosen solution. The process is continued by the individual implementing the solution followed by an evaluation of the anticipated as well as the unanticipated consequences of the chosen solution. This evaluation results in an examination of lessons that one has learned from the process and culminates with a framing of the context as a summative response to the informal learning process. This process is entirely couched in “context” or the complex environment in which the informal learning occurs (Cseh et al., 1999; Marsick et al., 2006).

The concluding phase of the informal and incidental learning model, framing the context, forms the foundation for further individual learning. Framing the context provides a point of

variation from individual to individual based on one's framing of the context according to the individual variation attested to by scholars (Cole, 1996; Cseh et al., 1999; Lewin, 1974; Owen, 2009; Wertsch, 1990). This variation may be attributed to the forming of individual frames of reference which influence the informal learning process (Marsick & Watkins, 1990; Mezirow, 2000; Owen, 2009). Figure 1 represents the model that underpinned this study. While the model itself was not tested specifically in this study, it served as a guide to better understand the participants' frames of reference, their process of informal learning, and the influence of such frames of reference on their informal learning.



*Figure 1.* Informal and Incidental Learning Model (Marsick, Watkins, Callahan, & Volpe, 2006).

### Guiding Question

The following guiding question was used to focus the study:

How do frames of reference influence the informal learning process?

## **Design of the Study**

A qualitative case study design was used to gain a deeper understanding of the influence of individual frames of reference on the process of individual informal learning (Bogden & Biklen, 2003; Ellinger, Watkins, & Marsick, 2005; Gall, Gall, & Borg, 2003; Stake, 1995). Individual frames of reference are a product of an individual's perceptions of a context while context is an expression of the sociocultural, socio-historical, and environmental facets as perceived by the individual as one assigns meaning to these phenomena (Cole, 1996; Jurasaitė-Harbison, 2009; Lewin, 1974; Marsick, 2009; Mezirow, 2000; Jarvis, 2006; Wertsch, 1990). Observation and a document review provided insight into the operational the daily activity of the participants and the operational context. Individual frames of reference were explicated by obtaining a biographical account from each participant along with illuminating his or her engagement in informal learning through an articulation of the problems that he or she met in his or her early teaching experience. This provided a comprehensive view of the field of the individual and the interwoven aspects that influence the informal learning process (Cole, 1996; Dewey, 1938; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Lewin, 1974; Marsick, 2009; Rogoff, 2003; Vygotsky, 1978).

## **Research Setting**

Research indicates that opportunities for informal learning are most frequent in non-routine, unstable environments where prescribed processes and procedures fail to provide adequate means of understanding situations or strategy development to resolve problems that are encountered (Brockman & Dirkx, 2006; Lohman & Woolf, 2001; Marsick & Watkins, 1990). Therefore, the selection of participants who have such conditions present in their daily work-life



experience, and have a limited range of experience in their profession, were deemed optimal for this study.

Although numerous occupations have the characteristics of such a setting, the aviation training environment was selected because it provided both elements of an unstable environment and access to novice practitioners. The aviation training setting is a technical face-to-face instructional environment that is complicated by daily variations in pedagogy, weather, and social dynamics which often lend themselves to non-routine situations. Further, recently certified flight instructors (CFI) in the aviation training environment provide suitable characteristics by being new to the domain of teaching, while engaging with various complexities in their environment, and not necessarily having had the opportunity to develop routine responses to the novel responsibilities. The unpredictability of this environment, coupled with the inexperience of new flight instructors, presented ample opportunities to examine the influence of individual frames of reference on the process of informal learning.

Five women and five men, participated in this qualitative case study. These participants were selected based on a purposeful intensity sampling design to obtain information rich data. This approach was determined to be an appropriate design to facilitate examination of the influence of individual frames of reference on informal learning (Gall et al., 2003; Patton, 2002; Stake, 1995). Data were gathered through observation, document review, and a series of semi-structured interviews to understand the context of the learning environment, the development of the participants' frames of reference, and the challenges they encountered which stimulated their informal learning (Emerson, 2001; Kvale, 1996; Patton, 2002). The researcher and participants collaborated through a reflective process during the interviews and informal discussions to

clarify meaning, develop a richer understanding of the participants' experience, to identify their individual frames of reference, and to illuminate the influence of such frames of reference on the informal learning of the participants. Constant comparative analysis was used to analyze the data and provide an accurate portrayal of the experiences of the participant (Bogden & Biklen, 2003; Emerson, Fretz & Shaw, 1995; Gall et al., 2003; Stake, 1995).

### **Significance of the Study**

This study contributes to the literature, theory, and practice of informal and incidental learning by furthering our understanding of how individuals develop and apply their individual frames of reference during the process of informal learning. This understanding informs approaches to teaching, working, and developing suitable environments which reflect an appreciation for an individual's experience and the context of the learning environment in light of various individual frames of reference. This study enhances awareness of the importance of individual sociocultural development with respect to learning in organizations (Marsick, 2009; White, Armstrong, Armstrong, Bourgeault, Choiniere & Mykhalobsky, 2000; Williams, 2003) and identifies potential variations of learning across contexts (Boud & Middleton, 2003; Hoekstra et al., 2009; Jurasaitė-Harbison, 2009; Marsick, 2009; Watkins & Cervero, 2000; White et al., 2000).

### **Assumptions**

This study assumed that (a) frames of reference are embedded in the sociocultural, historical construction of an individual's perceptions of his or her environmental or contextual factors, and contribute to the perception of novel experience encountered by an individual as a part of his or her lived experience; and, (b) that these frames of reference influence one's

perceptions and thereby one's responses and behavior to include the process of informal learning. Finally, it was assumed that (c) these characteristics are a common aspect of each person's lived experience and of particular interest in understanding informal learning as a process of human development.

### **Definition of Terms**

*Frame of reference* is considered to be "...a meaning perspective, the structure of assumptions and expectations through which we filter sense impressions" (Mezirow, 2000, p. 16).

For the purposes of this study, *environment* is considered to be the entire expression, in the broadest view, of the influences of sociocultural, historical, and environmental facets that are interwoven into the life experience of the individual. The *field* and *context* are considered embedded in and/or synonymous with environment. (Cole, 1996; Lewin, 1974; Wertsch, 1990).

*Culture* involves the developmental process of the individual and the society in which they are set as the collective accumulation of artifacts, symbols to include norms, values, and assumptions founded on a socio-historical mediated collective experience (Cole, 1996; Lewin, 1974; Rogoff, 2003; Vygotsky, 1978).

*Informal learning* is defined as learning that is under to control of the learner. Informal learning may be structured or unstructured, planned or unplanned, and is embedded in the life experience of individuals both at work as well as elsewhere (Marsick, 2009; Marsick & Watkins, 1990; Jarvis, 2006).

*Incidental learning* is embedded in, and often a part of, informal learning. Incidental learning is often not recognized by the learner, and is associated with, and a part of another

activity (Marsick & Watkins, 1990). Incidental learning shares the same characteristics as pre-conscious learning (Jarvis, 2006).

*Life-world* is representative of the everyday inter-subjective world of individuals including the thoughts, actions, and sociocultural facets that give substance to the world with which an individual is engaged and experiences as a part of daily life (Schwandt, 2001).

Schwandt (2001) identifies *lived experience* as representative of the “life-world as it is lived, felt, undergone, made sense of, and accomplished by human beings (p. 84).” It is the daily experience of an individual engaged in his or her life-world.

*Human development* is considered to be that process by which individuals are transformed through their interaction in the sociocultural setting and is interwoven with learning as a contributor to the culture across time and history (Rogoff, 2003).

*Perception* is considered to be the manifestation of one’s beliefs regarding some situation or phenomena as a transformed mental state representing the situation or phenomena (Jarvis, 2006).

A *paradigm* is a matrix of “commitments, values, methods, and outlooks...shared across a discipline (p. 184).” As such, a paradigm is a more generally held understanding of a domain or discipline (Schwandt, 2001).

A *flight instructor*, for the purpose of this study, is one that has completed the required training, testing, and certification requirements to conduct instruction in an airplane and the associated ground training required for pilot certification. Flight instructors are directly responsible for the one-to-one flight instruction of students.

## **Chapter Summary**

This chapter has provided an articulation of the background of this problem, statement of the problem, purpose of the study, the theoretical framework, research question, design of the study, the research setting, the significance of the study, assumptions, and definitions. Chapter 2 will present the literature relevant to this study. Chapter 3 will detail the design of the study. Chapter 4 will present individual biographies, informal learning, and problem profiles for each of the participants. Chapter 5 will present a synthesis of the findings across the participants. Finally, Chapter 6 will present the discussion of the findings, conclusions, and implications for practice and recommendations for future research.

## **Chapter 2**

### **Review of Literature**

This chapter reviews the literature domains relevant to studying how individual frames of reference influence informal learning. Resources used for this search included university, public, and private library resources, ABI-INFORM, EBSCO, Wilson Web Journal, Pro Quest, and Digital Dissertations. The following terms were used in the search: learning, informal learning, non-formal learning, experiential learning, social learning theory, sociocultural learning, experience, perspective, perception, frame of reference, identity, context, environment, situation, framing, and setting.

It has become more evident with the advent of the information or knowledge era that the learning of each member of the organization may take a prominent role in shaping the organization's future (Boud & Garrick, 1999; Marsick, 2009; McLagan, 1999; Senge, 2006). There is a large body of literature on the phenomena of informal and incidental learning as researched in varied contexts along with supporting evidence of its importance, especially in the area of individual and organizational development (Beattie, 2006; Boud & Garrick, 1999; Cheetham & Chivers, 2001b; Ellinger, 2005; Jarvis, 2006; Jurasaitė-Harbison, 2009; Marsick, 2009; Marsick et al., 2006). This literature review considered key aspects and contributions for understanding the process of informal learning and the development of individual frames of reference.

Major influential theories about how learning takes place include behaviorism, cognitive theory, social learning theory, humanistic perspectives of learning, and constructivism (Cheetham & Chivers, 2001a; Jarvis, 2006; Jurasaitė-Harbison, 2009; Merriam, Caffarella, &

Baumgartner, 2007). When considering the various orientations to learning, particularly informal learning, experiential learning has been recognized by scholars as a comprehensive lens for elucidating the learning of adults in the workplace (Gola, 2009; Jarvis, 2006; Marsick et al., 2006; Marsick & Watkins, 1990).

This literature review also investigated the importance of the *field* as described by Lewin (1974) as an intimate part of an individual's life experience contributing to experiential learning. The *field*, or the environment, represents the varied influences interwoven into daily experiences of an individual, which locate the parameters in which learning occurs (Boud & Garrick, 1999; Boud & Middleton, 2003; Cole, 1996; Cseh, 1998; Cseh, Ardichvili, Gasparishvili, Krisztian & Nemeskeri, 2004; Dewey, 1938; Hoekstra et al., 2009; Jarvis, 2006; Lewin, 1974; Marsick, 2009; Marsick & Watkins, 1990; Vygotsky, 1978).

How one frames experience, and the subsequent influence of this frame of reference on one's learning, was also considered in this review. A *frame of reference* is interwoven with environmental factors of one's life experience, including informal learning, such that each is influenced by individual perception through underlying values, beliefs, and assumptions developed through individual experience, and embedded in one's sociocultural setting (Jarvis, 2006; Jurasaitė-Harbison, 2009; McNally et al., 2009; Mezirow, 2000; Rogoff, 2003).

Experiential learning is situated in the field, or environment, and is mediated by one's individual frame of reference providing the foundation for the process of informal learning and individual development (Evans & Kersh, 2004; Hodkinson & Hodkinson, 2003; Hoekstra et al. 2009; Jarvis, 2006; Lave & Wenger, 1991; Lewin, 1974; Marsick, 2009; Marsick & Watkins, 1990; Marsick et al., 2006).

## **Learning and Development**

Scholars consider learning a major factor in the development of each individual. From the time of infancy, one's sociocultural, natural, and cognitive processes shape one's behavior in response to the world (Jarvis, 2006). One's engagement with the environment provides an expectation for one's future experience (Jarvis, 2006; Kolb, 1984; Lewin, 1974; Merriam & Caffarella, 1999; Rogoff, 1990; Vygotsky, 1978). Learning often leads to specific social interaction and development in each social setting one might find him or herself providing a context for each experience.

Common social interactive environments which provide learning and developmental opportunities include one's family, school, employment, as well as the individual engagement with the culture of one's setting (Billett, 2004; Ganter & Yeakel, 1980; Jarvis, 2006; Kolb, 1984; Korte, 2009; Lewin, 1974; Merriam & Caffarella, 1999; Owen, 2009; Vygotsky, 1978). Some scholars have argued that all learning is embedded in individual experience, that learning is gained from experiences encountered in one's every day life, and that this learning forms the basis of the individual developmental process (Cole, 1993; Jarvis, 2006; Kolb, 1984; Kolb & Kolb, 2005; Marsick, 2009; Rogoff, 2003; Vygotsky, 1978). Dewey (1938), for example, asserted that the most effective educative process is constructed from individual experience, or what scholars identify as experiential learning (Jarvis, 2006; Kolb, 1984).

## **Experience and Learning**

Dewey (1938) contended that the soundness of individual experience was the basis for the educative process. Similarly, Kolb (1984) has asserted that to understand learning one must understand it as a process embedded in the daily experiences of individuals, rather than simply as



the measurement of certain behavioral outcomes or embedded in cognitive processes alone. Jarvis (2006), along with Dewey (1938), and Kolb (1984), tied experiential learning to an individual's personal development in building one's autonomy, shaping values and beliefs, fostering knowledge, and contributing to one's understanding of his or her world as the existential process of being. Further, Kolb (1984) and Jarvis (2006) contend that only through the perspective of experiential learning can one encompass the whole of human learning across the many theories that have attempted to examine individual learning. Experience is an integral part of each person's life that fosters learning, knowledge, and development as an ongoing life-long process. The recognition that experience fosters learning is considered self-evident by many scholars based on common experience of human kind (Cheetham & Chivers, 2001a; Dewey, 1938; Jarvis, 2006; Marsick & Watkins, 1990; McNally et al., 2009; Merriam & Caffarella, 1999; Merriam, Caffarella, & Baumgartner, 2007).

In a qualitative study that examined the experience of nurses faced with a dramatic change in the workplace environment, a key finding that emerged was the importance of experiential learning. This learning occurred as a part of every day work through collaboration with other individuals such as staff, doctors, patients, and primary care givers. In this study, the implementation of a computer based assessment program, coupled the substitution of remote electronic monitoring devices, and a reduction of staff resulted in a decrease in social interaction that had been a part of the every day experience of the participants (White et al., 2000). This loss of social engagement was perceived as a loss in vital learning opportunities that had been embedded in the daily experiences of this workplace.

As one is engaged in lived experience, one encounters situations, problems, or events, which challenge underlying beliefs and embedded or routine strategies resulting in opportunities for learning (Casey, 1999; Dewey, 1938; Gola, 2009; Jarvis, 2006; Kolb, 1984; Marsick, 2009; Marsick & Watkins, 1990; van Manen, 1990). Each experience facilitates the expansion of one's understanding of one's world (Dewey, 1938; Jarvis, 2006; van Manen, 1990). Billett (2004) has remarked that learning is not bounded by the classroom, the workplace, nor strictly defined by culture or environment. Scholars acknowledge that setting does not restrict the lens of experiential learning as it resides in the various experiences of one's life wherever he or she may be. Some identify learning then as the process of becoming and the act of being (Evans & Kersh, 2004; Jarvis, 2006; McNally et al., 2009; Merriam, Caffarella, & Baumgartner, 2007).

Merriam and Mohamed's (2000) research on the influence of culture on aging illustrated the every day aspects of cultural influences on learning. Though often not recognized as learning, such learning is embedded in the beliefs and values of the culture (Jurasite-Harbison, 2009). Others have identified learning as a part of an individual's everyday experience in the workplace (Billett, 2004; Boud & Middleton, 2003), in the interaction among teachers (Lohman, 2006; Williams, 2003), for nurses as they engage and wrestle with daily problems (Ockerby, Newton, Cross, & Jolly, 2009; Starr & Conley, 2006; White et al., 2000), or as a common part of daily life away from the workplace (Evans & Kersh, 2004; Merriam & Caffarella, 1999; Merriam, Caffarella, & Baumgartner, 2007). Experiential learning, as a comprehensive learning theory, is suited to understanding learning in the workplace, or elsewhere, allowing one to consider the whole person inclusive of the mind, body, and emotion as embedded in the

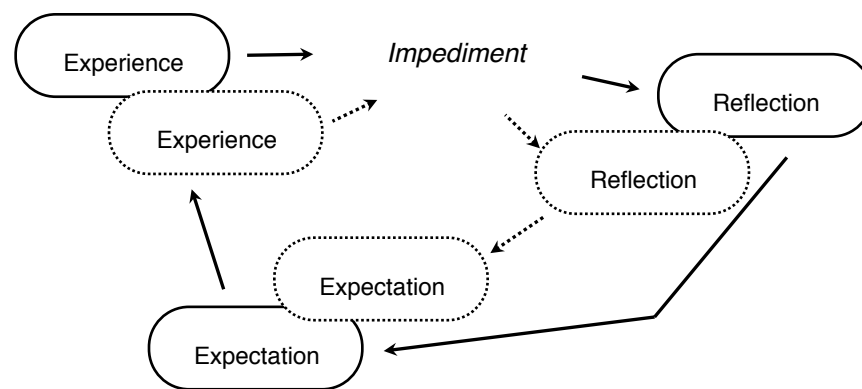
sociocultural setting (Jarvis, 2006; Kolb, 1984; Lave & Wenger, 1991; Marsick, 2009; Marsick & Watkins, 1990; Marsick et al., 2006; Vygotsky, 1978).

Marsick and Watkins (1990) defined learning as, “...the way individuals or groups acquire, interpret, reorganize, change...information, skills, and feeling...” (p. 4). They have acknowledged that, “...it is primary to the way in which people construct meaning in their personal and shared organizational lives...” (p. 4). In constructing meaning of one’s surroundings, environment, and interactions, individual experience shapes how one perceives sensory inputs and influences how he or she responds to an experience (Boud & Garrick, 1999; Boud & Solomon, 2003; Dewey, 1938; Jarvis, 2006; Merriam, Caffarella, & Baumgartner, 2007). When encountering a new experience, individuals make sense of the experience in concert with values, beliefs, and assumptions that they have developed (McNally et al., 2009). These structures form a frame of reference from which expectations are shaped, providing a lens for further encounters with the environment (Dewey, 1938; Hoekstra et al., 2009; Kim, 1993; Merriam & Caffarella, 1999; Marsick, 2009; Mezirow, 2000; Schwandt, 2005; van Manen, 1990).

Starr and Conley (2006) followed nursing students who participated in an extern program during the summer months between semesters. These students were exposed to, and challenged by, various practical experiences as they worked along side experienced staff members. The participants indicated that the experience provided clarification, confidence, and reinforced their career goals. This illustrates the ability of one’s experience to influence one’s expectations for future experiences as a part of learning (Dewey, 1938; Gola, 2009; Jarvis, 2006).

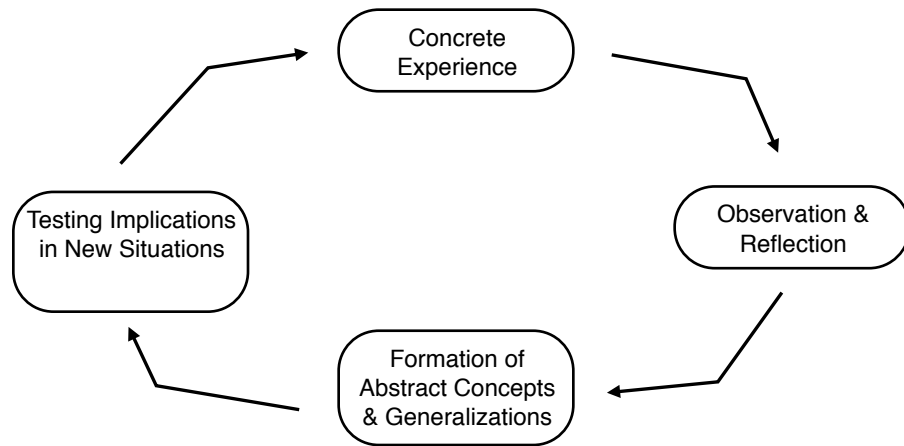
Experience is not bounded by location or time, but is a continuous process that transcends the various roles of individual lives. Experience crosses from one place and time to another influencing one's frame of reference (Dewey, 1938; Jarvis, 2006; Mezirow, 2000; Owen, 2009; van Manen, 1990). Evans and Kersh (2004) found skills acquired through such non-work settings as child-care, managing a home, and personal travel provided a backdrop to effective skills transfer for the workplace for some of their participants. Individual reports of the utility of learning from various settings illustrate its ability to transcend temporal or physical boundaries (Solomon, Boud, & Rooney, 2006).

One might construct a cyclical model, based on the observations of Dewey (1938), that represents a process of encountering an experience which when engaged reflectively propagates an expectation for further experiences as depicted in Figure 2.



*Figure 2.* Dewey, Experience to Expectation.

Kolb (1984) conceptualized a model of experiential learning, as depicted in Figure 3, founded on his conception of Lewin's (1974) presentation of change as an individual engaged in an experience.

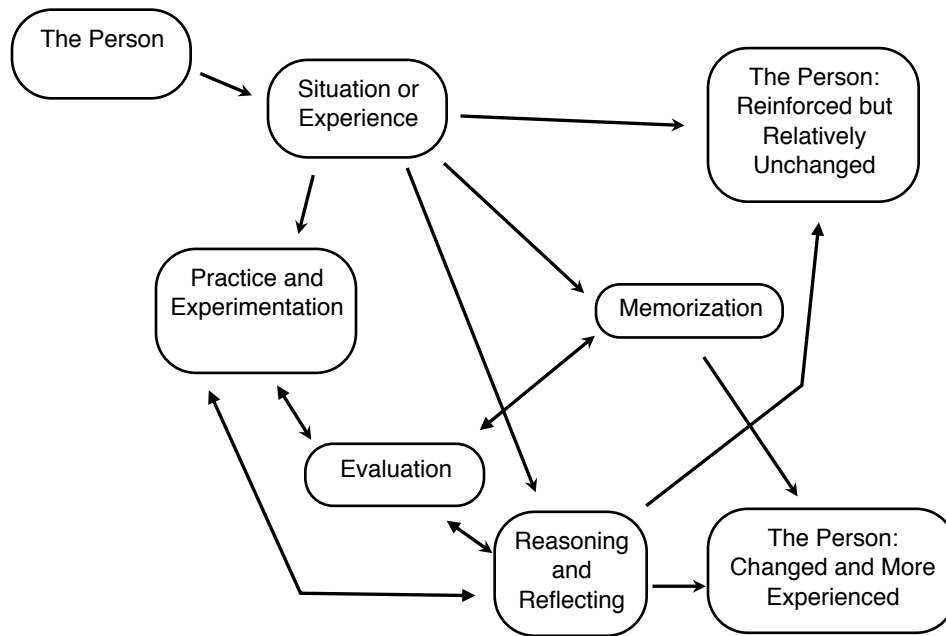


Source: Change Model, Lewin in Kolb. (1984, p. 21)

Figure 3. Experiential Learning Model, (Kolb, 1984).

Similar to Dewey's (1938) ideas of experiential learning, Kolb's (1984) model incorporated an element of reflection throughout the process resulting in a change in one's frame of reference for future experiences. In Kolb's Model (1984), movement from *Concrete Experience* to *Observation and Reflections* on to *Formation of Abstract Concepts and Generalization* then to *Testing Implications* as a process of learning. In each of the phases of Kolb's Model (1984) reflection is implicitly embedded leading to expectations for further engagements.

Jarvis (2006) has also argued that experience fosters expectancy through his definitions of reflective as well as non-reflective learning as in Figure 4.



The person engages an experience or situation. Unreflective reinforcement may lead to the person relatively unchanged or may lead to practice and experimentation or reasoning and reflecting. An exchange may occur between practice and experimentation, evaluation, and reasoning and reflecting. The interchange of practice and experimentation, evaluation, and reason and reflecting may reinforce or change the person. Alternately the experience may be memorized and directly lead to change and more experience. Source: Jarvis, 2006, p. 9.

*Figure 4. The Process of Learning (Jarvis, 2006).*

The explicit reflection of Dewey (1938) and Kolb (1984) however, is not considered by Jarvis (2006) to be instrumental to developing a new frame of reference. Jarvis (2006) contends that non-reflective learning may still lead to some form of learning and reframing, though it may be unrecognized by the individual. In concert with this, Gola (2009) found in a study of social workers that individuals experienced a change in meaning as a result of implicit learning.

**Reflection and experience.** Reflection is defined as the taking of experience and reconstructing it through a critical approach to get at the meaning of the experience (Dewey, 1938; van Manen, 1990). As one is engaged with an event or experience, he or she may simply react routinely or ignore the experience altogether (Dewey, 1938; Jarvis, 2006). However, with the process of critical reflection, one enters a deeper understanding, a deeper level of learning

from the experience giving it a richer tangible meaning (Argyris, 1977; Dewey, 1938; Jarvis, 2006; Kim, 1993; Lohman, 2006; Marsick, 2009; Marsick & Watkins, 1990; van Manen, 1990). Scholars agree that reflection is essential in constructing useful explicit knowledge (Dewey, 1938; Gola, 2009; Jarvis, 2006; Kolb, 1984; Lohman, 2006; Marsick, 2009; Marsick & Watkins, 1990).

Mezirow (2000) has indicated that transformational learning includes critical reflection and dialogue as an integral part a transformational learning process. He as well as other scholars argue that without critical reflection true transformation cannot take place (Marsick, 2009; Taylor, 2008). For example, nursing students engaged in the extern program indicated the interaction that they engaged in on the hospital floors provided a lens to view the medical profession which had not been available in the academic setting. Working along side experienced practitioners, these students solidified their career goals and transformed their understanding of the profession, highlighting the complexity that medical professionals encounter (Starr & Conley, 2006). In another study, managers indicated that they learned through prior experience, utilizing methods and strategies gained by reflective consideration of their experience with managers under whom they had worked (Billett & Pavlova, 2005). Finally, it has been noted that collaboration with others is a key tool of teachers as learners for meeting the needs of the classroom and other workplace demands (Lohman, 2006; Reardon, 2004).

Collaboration, as a form of dialogue, has been identified as instrumental in facilitating learning and fostering understanding in studies of teaching, the practice of nursing, for managers, as well as for students engaged in classroom activities (Beattie, 2006; Boud & Middleton, 2003; Casey, 1999; Ellinger & Bostrom, 2002; Jarvis, 2006; Lohman, 2001, 2006; Marsick, 2009;

Marsick & Watkins, 1990; Marton & Booth, 1997; Reardon, 2004; Starr & Conley, 2006; Williams, 2003). One possible reason for the prevalence of collaboration as a learning strategy is that actions such as collaboration, discourse, and writing implicitly provide an avenue to critical reflection, thereby elevating one's understanding and fostering of meaning structures for evaluation of one's experiences (Marton & Booth, 1997).

**Unproductive experience.** Whether one reflects on an experience or not, he or she is nevertheless influenced consciously or unconsciously by the encounter resulting in some form of reframing of expectations for future experiences (Gola, 2009; Jarvis, 2006). In some instances, reframing has proved to be faulty having been based on inaccurate perceptions resulting in a faulty frame of reference which has influenced further experience (Boud & Solomon, 2003; Dewey, 1938; Hoekstra et al., 2009; Jarvis, 2006; Mezirow, 2000). It has been shown that not all experience fosters beneficial learning, education, or developmental value (Dewey, 1938; Jarvis, 2006; Kolb, 1984; Owen, 2009).

Dewey (1938) contended that in some cases an experience could be "...mis-educative..." (p. 25) in that the result of the experience failed to effect openness to further educative experience but rather resulted in resistance to learning. Kolb (1984) asserted that an encounter could be openly rejected and therefore, not produce learning that resulted in behavior, attitude, or skill change for the individual. Jarvis (2006) contends that learning may still have taken place by defining new frames of understanding, though one is unconscious of the influence. One's behavior, attitudes, or expectations of further experience have been influenced by an experience; thus, reframing his or her understanding of his or her world and lived experience.



Jarvis (2006) identified one form of learning as pre-conscious learning. Pre-conscious learning is non-reflective learning that is often embedded and unrecognized in one's belief and value structure. Yet, pre-conscious learning may influence the behavior, attitude, or expectations of further experiences of the individual (Gola, 2009; Jarvis, 2006; McNally et al., 2009). The process of encountering an experience is mediated by reflection to provide an educative or conscious learning experience, which leads to reframing expectations (Dewey, 1938; Gola, 2009; Jarvis, 2006; Kolb, 1984; Mezirow, 2000; Taylor, 2008). However, with each encounter a change takes place in individual perception and expectations to some degree. If the change is based on faulty interpretation and non-reflective learning, the experience may foster a faulty frame of reference for further encounters (Dewey, 1938; Jarvis, 2006). This is particularly important as one seeks to engage in quality education, to develop effective workplaces, to foster workplace learning, and enable quality personal development. A faulty frame of reference places one in a position of disadvantage with any new encounter because, the lens of understanding, or frame of reference, is skewed and may foster further misinterpretation, leading to a faulty response to the learning opportunity. This may potentially propagate a cycle of low performance or development.

Individuals engage with experience through circumstances encountered in their daily lives. Embedded in these experiences one participates in learning. However, the value of that learning is of chief concern to educators, organizational developers, and human resource development (HRD) practitioners (Dewey, 1938; Jarvis, 2006; Kolb, 1984; Kuchinke, 1995; Marsick, 2009). The development of one's frame of reference is the result of past experience that forms individual assumptions, values, and beliefs that are used as a lens to give meaning to

future experience. The individual's beliefs, values, and assumptions are embedded in an environment from which he or she engages an experience as a part of learning. Scholars indicate that one's environment influences one's perceptions and factors into frame of reference development, shaping a context for learning (Dewey, 1938; Jarvis, 2006; Lewin, 1974; Merriam & Mohamad, 2000; Mezirow, 2000; Owen, 2009).

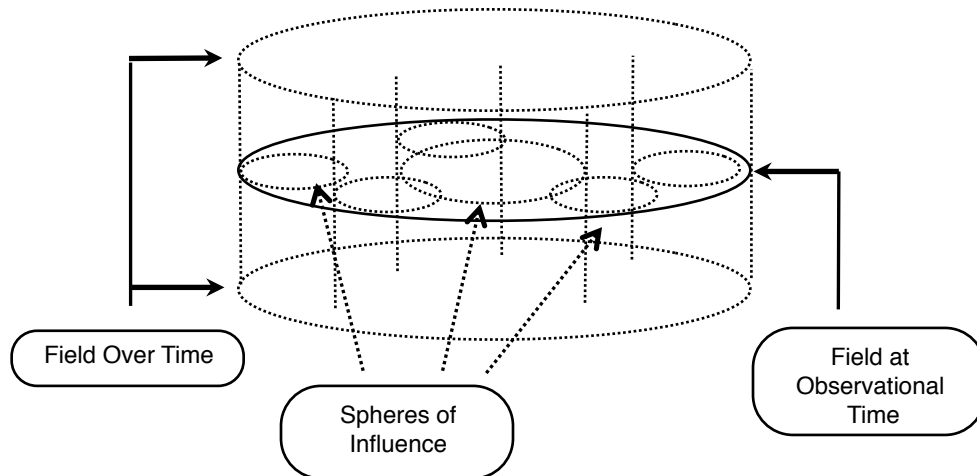
### **Field Theory**

Hodkinson and Hodkinson (2003) have acknowledged that individuals not only learn in context but also are a "reciprocal part of context" (p. 4). Individuals are both influenced by the context of the learning situation and likewise influence the environment or context with which they are associated. Each individual has distinct experiences as a part of his or her life history. Much of the interpretation of these experiences are shaped by and interwoven in the environment (Boud & Middleton, 2003; Boud & Solomon, 2003; Cole, 1993; Ellinger & Cseh, 2007; Merriam & Caffarella, 1999; Merriam & Mohamad, 2000; Owen, 2009; Vygotsky, 1978). Scholars agree that individuals are continually affected by, and affect the environment that they engage with as a part of experience (Hodkinson & Hodkinson, 2003; Jurasaitė-Harbison, 2009). Further, scholars contend that learning does not occur in isolation, but is influenced and interwoven with the sociocultural fabric of the individual's experience (Cseh et al., 1999; Dewey, 1938; Hoekstra et al., 2009; van Manen, 1990; Vygotsky, 1978).

Lewin (1974), as well as other scholars, indicate that meaning is socially constructed by the values, norms, assumptions, and beliefs of the individual in association with others as a social being (Billett & Pavlova, 2005; Cole, 1996; McNally et al., 2009; Vygotsky, 1978). Such social construction of meaning shapes one's perception of experience, providing a frame of reference of

one's world (Hodkinson & Hodkinson, 2003; Hoekstra et al., 2009; Jarvis, 2006; Merriam & Caffarella, 1999; Merriam & Mohamad, 2000; Mezirow, 2000; Vygotsky, 1978). For each individual, there are many spheres of influence that surrounds and create what Lewin (1974) identified as the *field*.

The field represents the particular environment including, time, place, and culture of an individual (Lewin, 1974). Lewin (1974) identified the field as the cross section of all of the spheres of influence that surrounds the individual, providing varying influences, each with their own boundaries, but often overlying and influencing one another as depicted in Figure 5.



The Field is the aggregate of the influences of an individual that extend through time in which the various influences interact and overlap to constitute the individual field. The Field varies with time making the Field Dynamic while at a particular moment one may observe only a slice of the Dynamic Field. Lewin (1974)

*Figure 5.* Cross Section of the Dynamic Field.

Other scholars identify the environment as the sociocultural elements that are inclusive of the field. However, more than simply influencing the spheres, context, and environment, these elements are represented as being interwoven in the very fabric of one's being to include socio-historical and sociocultural aspects, underscoring one's socially constructed meaning (Cole, 1996; Polanyi, 1964; Rogoff, 2003; Vygotsky, 1978). Scholars have expressed these influences

as one's life-world (Jarvis, 2006; Mezirow, 2000; van Manen, 1990), or as context (Boud & Garrick, 1999; Casey, 1999; Cole, 1996; Cseh et al., 1999; Ellinger, 2005; Marsick & Watkins, 1990; Marsick et al., 2006), or by some they are identified as the environment (Boud & Garrick, 1999; Evans & Kersh, 2004; Jarvis, 2006).

The complexity of the field, seen as interwoven facets of social, cultural, and historical spheres that influence an individual, represents the variable dimensions of an individual's environment that influences his or her learning (Cole, 1996; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Jurasaitė-Harbison, 2009; Lewin, 1974; Rogoff, 2003). Each individual manifests a complex interweaving of these sociocultural, socio-historical dimensions with his or her own individuality. There may be sharing of similarities to some extent with others of similar origin; therefore, meaning and understanding are socially constructed based on common experience (Cole, 1996; Lewin, 1974; Rogoff, 1990).

Examples of these spheres of influence have been identified by some scholars as one's family members, significant others associated with an individual, one's peer relationships, the workplace, or school (Hoekstra et al., 2009; Owen, 2009). Additionally, the social strata in which an individual is considered a member, the culture in which one lives, and other social, physical, and psychological phenomena, which are found as a part of the everyday lives of individuals have also been identified as spheres of influence to one's development (Casey, 1999; Cole, 1996; Evans & Kersh, 2004; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Kolb, 1984; Lewin, 1974; Merriam & Mohamad, 2000; Reyes, 2006; Vygotsky, 1978). Such influences include the historical context in which these influences have been and are situated, as well as

providing a socio-historical tint to individual experience (Cole, 1996; Jurasaitė-Harbison, 2009; Rogoff, 2003; Vygotsky, 1978).

The field then is the aggregate of all the factors, physical, psychological, social, transcendental, and emotional, which intersect with and are interwoven as a part of an individual (Jarvis, 2006; Lewin, 1974; van Manen, 1990). The meaning structures formed as a part of this interaction of the individual with the environment renders a sense of identity for the individual (McNally et al., 2009). In accordance with one's identity, one assumes a particular stance, indexing a frame of reference, and acts in accordance with identity to the limits of individual agency (Jurasaitė-Harbison, 2009; Ochs, 1992; Polanyi, 1964).

**Dynamic nature of the field.** Lewin (1974) stated that one's behavior was derived from the totality of these coexisting factors and that these factors were interdependent on one another. The interplay of these factors influence, and are interwoven with other spheres, as well as the whole. Concurrently, the whole of the field influences and is influenced by all the other spheres forming a "dynamic field" (Lewin, 1974, p. 24). The dynamic nature of the field is an expression of the living changing character of one's field, or sociocultural context, through engagement, and development through lived experience (Cole, 1996; Marsick, 2009; Wertsch, 1990).

For instance, Merriam and Mohamed's research (2000) illustrated how the sociocultural context influenced individuals as they delineated a distinction between Western European and American attitudes compared with East Asian attitudes regarding aging. They pointed out that attitudes were demonstrated through behaviors directed toward the aged that were displayed by each culture. They attributed the influence on behavior to how the two cultures differentially

valued aging and how each culture responded to the aging process. On the one hand, Eastern attitudes were displayed with respect and veneration of the aged. Western attitudes in contrast generally tended to involve avoidance and distance from the aging process. In another study, a cultural effect was also demonstrated by how some individuals perceived being designated as a learner in a workplace setting. These individuals indicated that being identified as learners had a negative connotation of being deficient, unskilled, or lacking knowledge (Boud & Solomon, 2003). Further, in another study perception of the workplace influenced the activities of teachers (Hoekstra et al., 2009).

The integration of the dynamic field of an individual is significant when considering its influence on the behavior of the individual, particularly in the workplace. Scholars contend that the field influences one's view of the past, decisions for the present, as well as expectation of the future. This includes cognitive, emotional, and behavioral responses to the events encountered by the individual (Hodkinson & Hodkinson, 2003; Hoekstra, 2009; Jarvis, 2006; Lewin, 1974; Polanyi, 1964).

In their qualitative study of teachers, Hodkinson and Hodkinson (2003), found that individuals were reciprocally involved with the environment. That is, the participants were influenced by the environment, as well as influenced the environment in which they acted. Given the reciprocal influential nature of a dynamic field, scholars contend that a change in the individual will likewise affect a change in the field to some degree. This active interplay of the field and the individual renders the field as dynamic and interwoven, instead of a static inter-actor in the experience of an individual (Cole, 1996; Jarvis, 2006; Lewin, 1974; Marsick, 2009; Vygotsky, 1978).

**Individual and the field.** According to Lewin (1974), the field includes three psychological states: past, present, and future. At any given moment of time, one can only observe the present aspect of the field (Figure 5). These three states are addressed as psychological states to differentiate between the actual occurrence and the individual perception of experience, despite the actual or factual reality. Each event is interpreted in a socially constructed matrix yielding meaning for the individual (Jurasaitė-Harbison, 2009; Lewin, 1974; Vygotsky, 1978). How one perceives his or her past, how one perceives his or her present, and what one anticipates or expects in the future constitutes his or her individual practical reality. There is a theoretical convergence of these three psychological states as postulated by Lewin (1974) as the field [present] converges with Dewey's (1938) concept of experience fostering expectations [future] as well as the historically influenced cultural context [past] of Vygotsky (1978) in constructing meaning for an individual. Thus, the social context and individual mutually influence perception and interpretation of experience fostering expectations.

Hodkinson and Hodkinson (2003) identified what they called, “dispositions to learning, to work, to career (p. 5)” which they contend, “develop, and evolve through the experiences and interactions within the learner's life course” (p. 5). The concept of *disposition* correlates with a frame of reference in which an individual perceives the particular setting whether in learning, work, or career path development. These dispositions, since they evolve or are developed through an individual's personal experiential biographies, can only be understood when aligned with the learner and his or her personal history. This alignment illuminates the development of the dispositions which are manifested in the slice of time of the observation (Dewey, 1938; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Lewin, 1974; Rogoff, 2003).

Jarvis (2006) has contributed to an understanding of the interaction of the past, present, and future in expressing the idea that not all experience facilitates a conscious awareness of the effect on expectations for the future. He indicated that the influence of these experiences may lie dormant or embedded in pre-conscious and non-reflective knowledge, which in turn fosters non-reflective expectations. Therefore, one's behavior or cognitive structure depends on how one frames the field at the present time (Jarvis, 2006; Hoekstra et al., 2009; Mezirow, 2000). This frame of reference is composed of the experiential history, mediated in a sociocultural context, with how one differentiates the various situations with which one intersects at the given time (Cole, 1996; Jarvis, 2006; Jurasaitė-Harbison, 2009; Lewin, 1974; Mezirow, 2000; Vygotsky, 1978).

Evans and Kersh (2004) found that skills and abilities lay dormant in the tacit knowledge of re-entering adult workers. They contend that these tacit skills and abilities must be recognized, surfaced, and deployed upon being placed in a new environment to be utilized effectively. These areas of tacit knowledge were the result of learning activities outside the current workplace setting gained informally or incidentally, as a part of the individual's everyday experience. McNally et al. (2009) found that the informal learning of new teachers tended to be tacit and embedded in one's daily activity. The utilization of individual knowledge was mediated by the individual's framing of the environment consistent with other studies (Evans & Kersh, 2004; Hoekstra et al., 2009; Marsick & Watkins, 1990; Marsick & Watkins, 2001; Nonaka, 1991).

**Reflection and the field.** Reframing individual understanding is especially evident when encountering a new experience that is not routine. Such an encounter requires ascertaining the



meaning of the experience through critical reflection (Berings, Poell, & Gelissen, 2008; Marsick 2009; Marsick & Watkins, 1990; Mezirow, 2000). Sometimes, the experience and its meanings may be unreflectively categorized in one's frame of reference (Gola, 2009; Kim, 1993; Merriam & Caffarella, 1999; Mezirow, 2000; van Manen, 1990).

Much of the reflective process is conducted in an environment of collaboration as one interacts verbally, physically, and emotionally with others in developing understanding and reframing an experience (Berings et al., 2008; Jarvis, 2006; Kim, 1993; Lohman, 2006; McNally et al., 2009; Marton & Booth, 1997; Mezirow, 2000; Starr & Conley, 2006; White et al., 2000; Williams, 2003). The act of communication is believed to be a powerful source of reflection and learning. This emphasizes the social construction of individual perceptions of one's environment (Dewey, 1938; Jurasaitė-Harbison, 2009; Marton & Booth, 1997; Mezirow, 2000; Mumford, 1996; van Manen, 1990; White et al., 2000; Williams, 2003). In previously conducted research, teachers identified conversations as an event that elevated their understanding (Hodkinson & Hodkinson, 2003; Lohman, 2006) and nursing students indicated their collaboration on the hospital wing with other staff members became a powerful tool for learning (Starr & Conley, 2006). Through conversation and collaboration with others, individuals engage in critical reflection through dialogue as a part of a social construction and sense making process (Boud & Middleton, 2003; Lave & Wenger, 1991; Lohman, 2006; Marsick & Watkins, 1990; Mezirow, 2000; Starr & Conley, 2006; White et al., 2000; Williams, 2003).

Collaboration can be formalized or more naturally formed through informal associations both inside and outside of the workplace environment (Ardichvili, Page, & Wentling, 2003; Hodkinson & Hodkinson, 2003; Lohman & Woolf, 2001; Marsick & Watkins, 1990; Poell, Van

der Krogt, Vermulst, & Simons, 2006; Solomon et al., 2006). White et al., (2000) found nurses elevated their understanding of the policies and practices of the workplace through observation and verbal communication of experience. Williams (2003), as well as Boud and Middleton (2003), found that teachers utilized collaboration to discover their individual roles in changing work settings. This collaboration provided a socially constructed interpretive tool to give meaning to their environment, defining the field.

Thus far, this literature review has examined experiential learning as a body of literature important to understanding learning in the workplace. Learning is of strategic value for high quality performance, as well as personal development for individuals. Learning is dynamically influenced by the sociocultural field and experiential learning (Eraut, 2004; Jarvis, 2006; Kolb, 1984; Kuchinke, 1995; Marsick, 2009; Starr & Conley, 2006; White et al., 2000; Vygotsky, 1978). This review has also emphasized the importance of a whole person analysis based on the dynamic sociocultural field (Cole, 1996; Dewey, 1938; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Kolb, 1984; Lewin, 1974; Marsick, 2009; Vygotsky, 1978). Since informal learning is embedded in experiential learning and is interwoven into the dynamic sociocultural field, the next section explores this body of literature.

### **Informal Learning**

Marsick and Watkins (1990) originally developed their Informal and Incidental Learning Model based on the problem solving and action-learning models nested in the foundational work of Dewey's (1938) *Experiential learning theory* and Lewin's (1974) *Field theory and change process* models. Their Informal and Incidental Learning model was updated after an empirical

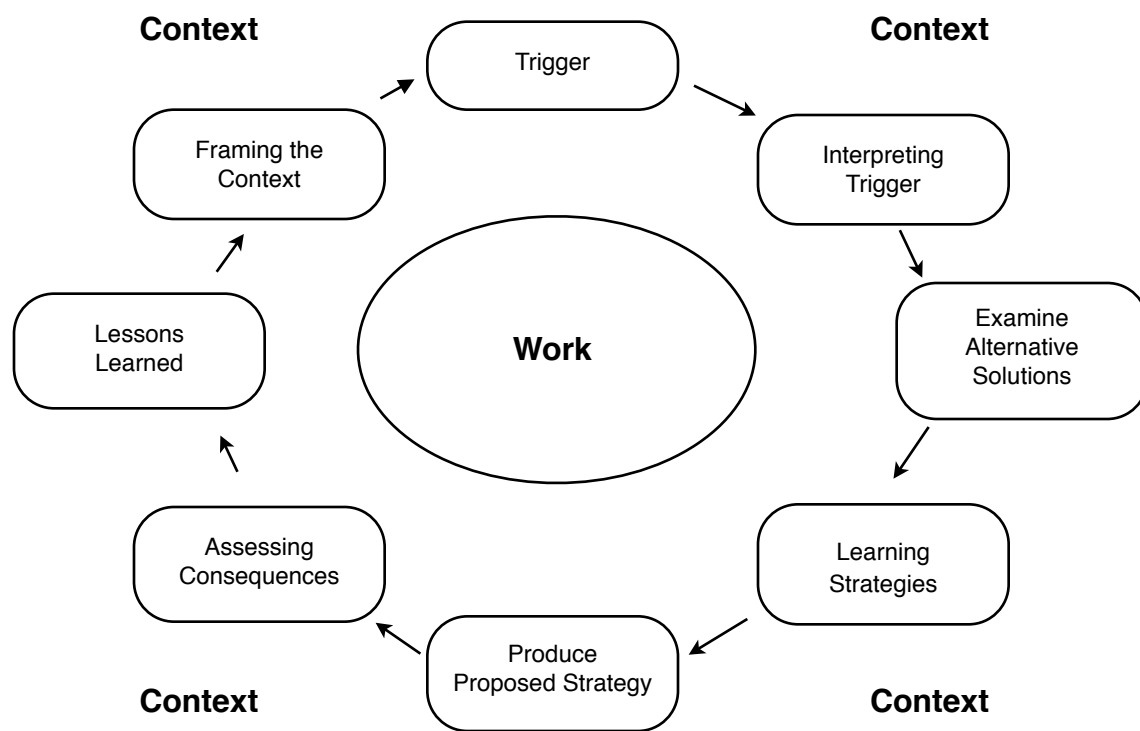
study by Cseh (1998) revealed a need to include a more explicit articulation of “*context*” throughout the entire framework of the model (Cseh et al., 1999).

It has been noted in the informal and incidental learning literature that individuals learn on a continuous basis in their everyday life both at work and elsewhere (Billett, 2004; Evans & Kersh, 2004; Jarvis, 2006; Marsick, 2009; Marsick & Watkins, 1990; Merriam & Caffarella, 1999; Solomon et al., 2006). It has been well established that when individuals enter the workplace there is a relatively high demand for learning and development of competencies to meet the demands of the workplace (Hoekstra et al., 2009; Jarvis, 2006; Marsick & Watkins, 1990). Historically organizations and institutions have implemented formal learning interventions to address this need of knowledge and skill acquisition. However, it has been demonstrated that informal learning accounts for the greatest amount of individual learning in the work place as well as in other settings (Garrick, 1998; Jarvis, 2006; Lohman & Woolf, 2001; Marsick, 2009; Marsick & Watkins, 1990). An increasing demand for continuous learning has occurred because of the high demand for new competencies, and the rapid decay of existing knowledge in a shorter period in today’s workplace (Casey, 1999; Ellinger, 2005; Lohman & Woolf, 2001; Marsick & Watkins, 1999). This demand supports the increased role and interest in informal learning in the workplace (Lohman, 2006).

Scholars have characterized informal learning as being structured or unstructured, intentional, or unintended, and incidental, although it is best described as being “predominantly unstructured, experiential, and non-sequential” (Marsick & Volpe, 1999, p. 4). Additionally, informal and incidental learning may occur in any aspect of one’s life experience (Boud & Garrick, 1999; Jarvis, 2006; Marsick, 2009; Marsick & Watkins, 1990, 2001). Regardless of the

intentionality, context, or origin of informal learning, its acquisition, utilization, and implementation are believed to be crucial to individual learning and development, organizational learning, as well as to process and performance improvement (Lohman, 2000; Marsick & Watkins, 1990; Marsick et al., 2006; Reardon, 2004; Stata, 1989).

Marsick, Watkins, Callahan, and Volpe's (2006) Informal and Incidental Learning Model, as depicted in Figure 6, represents a cyclical process model that identifies the various phases one might pass through when engaged in the process of informal learning. However, it has been noted that an individual may pass over various phases or terminate the process of informal learning prematurely (Marsick & Watkins, 1990).



*Figure 6.* Informal and Incidental Learning Model (Marsick, Watkins, Callahan, & Volpe, 2006).

To more fully comprehend the informal and incidental learning process the various elements of this model are described and expanded upon in the following sections of this review.

**Triggers.** Marsick and Watkins (1990) indicated that the informal and incidental learning process commences with a trigger. This is consistent throughout the literature on learning and development. Triggers to informal or incidental learning opportunities have been identified as jolts, environmental jolts, environmental instability, opportunities, challenges, dilemmas, discontinuities, and disjunctures (Boud & Solomon, 2003; Ellinger, 2003; Jarvis, 2006; Kolb, 1984; Lewin, 1974; Marsick, 2009; Marsick & Watkins, 1990; Meyer, 1982; Mezirow, 2000). Triggers are seen as events or situations that provide a catalyst that initiates the informal learning process (Ellinger, Watkins, & Bostrom, 1999; Reardon, 2004). Informal learning opportunities have been demonstrated to be more likely initiated when a trigger displaces the opportunity for a routine response or recognition and resolution (Boud & Middleton, 2003; Cseh et al., 1999a; Dewey, 1938; Jarvis, 2006; Kolb, 1984; Marsick & Watkins, 1990; Williams, 2003).

Triggers, as catalysts to informal learning, were categorized into three clusters in a study examining managers as facilitators of informal learning in the workplace. These clusters were identified as perceived gaps, political issues, and developmental opportunities (Ellinger, 2003). For engineers in another study, an organizational restructuring resulted in novel work assignments that acted as a trigger for informal learning (Reardon, 2004). Other studies have cited participants being approached by others to act as facilitators of learning or being faced with a challenging assignment as a trigger for informal learning (Ellinger & Cseh, 2007; McNally et al., 2009; Reardon, 2004).

**Interpreting the experience.** Once the informal learning process has been initiated by a trigger, the next phase in the informal learning process is to evaluate or attempt to understand the experience that acted as the trigger. During this phase, the influence of experiential learning and

field theory (Lewin, 1974) can be readily seen as one's interpretation is strongly influenced by lived experience, constructed expectations, and the contextual perception of the individual (Gola, 2009; Hodkinson & Hodkinson, 2003; Hoekstra et al., 2009; Jarvis, 2006; Lewin, 1974). The interpretive aspects of one's framing of prior experience and expectations have been identified in studies about workers, nurses, and teachers as they encountered novel situations in the workplace (Boud & Solomon, 2003; Hoekstra et al., 2009; Lohman & Woolf, 2001; Ruth-Sahd & Tisdell, 2007; White et al., 2000; Williams, 2003).

**Examine alternative solutions.** Next in the sequence of the process of informal learning is an assessment of the various solutions for a problem solving situation or the various possibilities of understanding the meaning of the experience in relationship to one's frame of reference. This phase of informal learning is illustrated by previous research about the collaborative activity observed by teachers tasked with implementation of an additional work requirement. These teachers fostered the development of various possibilities for implementation through their informal collaboration with peers, thus developing strategies through this engagement to meet the demands of the workplace (Lohman, 2006; White et al., 2000).

One study found that past learning, often gained outside of the specific field, contributed to an "intuitive" response to a given situation (Ruth-Sahd & Tisdell, 2007). This reflects a variation in individual experience with informal learning, in that an intuitive response may lead to bypassing a phase. In this case, participants moved directly to implementing a strategy through a tacit or preconceived framework acquired in a seemingly unrelated arena (Marsick & Watkins, 1990; Ruth-Sahd & Tisdell, 2007).

**Learning strategies.** During the phase identified as Learning Strategies, a learner begins to process and consider the strategies necessary to provide a solution to the problem or come to understand the situation. In her study of a transitioning economy, Cseh (1998) showed how the various managers developed strategies to gain the learning necessary to make adjustments or understand the situation when faced with a business difficulty. This situation was generated by the loss of the prior business support that had been provided by the government. The nursing students in Starr and Conley's (2006) study chose to enter into an extern program to overcome perceived practical experience deficiencies. During this experience, learners acquired skills and knowledge through collaboration, text materials, and development as a part of work to alleviate perceived gaps. Mumford (1996) identified intuitive, incidental, retrospective, and prospective approaches as variations to informal learning displayed by managers. Teachers indicated that they learned through sharing materials, collaboration with one another through talk, and used on-line resources to address learning needs for the workplace (Hoekstra et al., 2009; Lohman, 2006; McNally et al., 2009). More recent research has emphasized the importance role that various learning partners may play (Koopmans, Doornbos, & van Eekelen, 2006; Poell et al., 2006).

**Produce proposed solutions.** Having selected an approach and gained the required competence, the learner implements the solution, or may apply information to facilitate her or his understanding. In each situation, the participants take some form of action, cognitive adjustment, or both, to address the disjuncture or trigger (Cseh, 1998; Jarvis, 2006; Mezirow, 2000). For the nursing students this action was to participate in the extern program practically resolving the perceived deficiencies through the exposure, collaboration, and additional study in the field (Starr & Conley, 2006). The engineers in Reardon's (2004) study engaged in a daily

experiential process to informally learn new workflows both individually and through informal networks.

**Assess intended and unintended consequences.** Once an action has been taken, the following step in the process is to evaluate the consequences of the action. These outcomes include both those that the individual had anticipated as well as those that were encountered unexpectedly (Marsick & Watkins, 1990; Marsick et al., 2006). This phase also reflects the importance of understanding the various influences of one's perceptions through the dynamic nature of the field, and the importance of context informed by sociocultural meaning development (Cole, 1996; Jarvis, 2006; Jurasaitė-Harbison, 2009; Lewin, 1974; Reardon, 2004; Vygotsky, 1978).

As individuals perceive a particular situation or problem they often presume a cause and effect relationship based on their assumptions and beliefs. In some instances, these assumptions and expectations may be faulty and untested (Dewey, 1938; Jarvis, 2006; Mezirow, 2000). In either case, assessment of the consequences of informal learning may lead to further learning with implications for future learning expectations (Gola, 2009; Jarvis, 2006; Marsick, 2009). For example, workers in one study engaged in customer service work were directed to utilize strategies of misrepresentation that mediated customer problems temporarily. However, these strategies led to personal dissatisfaction and emotional disquiet for the workers. Ultimately, this caused them to leave the position while bearing an emotional injury (Howell, Carter, & Schied, 2001). Such consequences provide additional emphasis for the need to consider and develop a better understanding of the implications of implicit learning resulting from the informal and incidental learning process (Marsick, 2009; Marsick et al., 2006).



**Lessons learned.** The next step in the process facilitates the reforming of the individual's frame of reference aligned with the principles of experiential learning, dynamic field theory, and transformational learning (Dewey, 1938; Jarvis, 2006; Kolb, 1984; Lewin, 1974; Marsick & Watkins, 1990; Mezirow, 2000). In some studies involving the informal learning of managers, the participants indicated an intended change of behavior or prospective action in response to future encounters. Additionally, the managers reported a new awareness of themselves in response to lessons learned in their business dealings which had been affected by changes in both the internal and external environments of the business climate (Cseh, 1998; Ellinger, 1999, 2005; Terrion, 2006). This change of understanding indicated a change in an individual's frame of reference and an intended change in strategy for the future engagements. This transformation provided a glimpse of the informal learning fostered through the participant's experience when contrasted with the perception of the individual at the time of the trigger (Lewin, 1974).

Loham and Woolf (2001) identified experimenting as a form of learning that teachers engaged in. By reflecting on their actions these teachers adjusted their cognitive framework or adjusted their activities. Experimenting then is 'learning on the fly' as one implements a strategy or encounters a dilemma an adjustment is made through learning. Starr and Conley (2006) found their participants demonstrated increased confidence and reported changed understandings of themselves and their field of expertise after an informal learning experience. However, outcomes of informal, and particularly incidental learning, may remain tacit and ill-defined resulting in limited utility and individual development unless surfaced through a reflective process (Evans & Kersh, 2004; Marsick, 2009; Marsick et al., 2006; McNeally et al., 2009). This

highlights the importance of critical reflection on one's experience to explicate meanings and benefit from informal and incidental learning (Dewey, 1938; Marsick, 2009; Marsick & Watkins, 1997; Mezirow, 1997, 2000).

**Framing the context.** Framing the context represents a reflective transformation of the meaning of the informal learning experience (Marsick & Watkins, 1990; Mezirow, 2000). In her qualitative study, Cseh (1998) found managers used personal informal learning experience, coupled with their perceptions of the internal and external environment, as factors in framing their changing world. Similarly, Terrion (2006) found that participants changed how they framed themselves and their abilities in a new workplace context because of a supportive informal learning experience. Such examples indicate how informal learning fosters re-framing of an experience, and can lead to understanding of one's self and others as part of the informal learning process (Mezirow, 2000).

**Context.** An important facet influencing the informal learning process is the notion of context as framed by the individual (Ellinger & Cseh 2007; Cseh et al. 1999; Jurasaitė-Harbison, 2009; Marsick, 2009; Marsick & Watkins, 2001). Though context had been embedded implicitly in the existing model, Cseh's (1998) work revisited the notion of context. Her findings led to inserting context more explicitly in the model based on the heightened recognition of the importance played by context throughout the informal learning process (Cseh et al., 1999). Other research has further supported the importance of context in informal learning through the implications of context to employees and managers involved in informal learning (Beattie, 2006; Billett, 2004; Billett & Pavlova, 2005; Ellinger et al., 1999; Ellinger, 2005; Terrion, 2006), the influence on the learning environment exerted by variations in context (Eraut, 2004; Lohman,

2000, 2006; Reardon, 2004), and employee expectations founded on contextual markers (Ellinger & Cseh, 2007; Hoekstra et al., 2009; Watkins & Cervero, 2000; Owen, 2009; Starr & Conley, 2006).

This review has illustrated the importance of understanding how individuals frame the environment as being both the underlying framework from which informal learning commences, as well as the outcome of engaging in informal or incidental learning. Though the informal learning process might commence with a *Trigger* and conclude with *Framing the Context*, the process is situated in the sociocultural environment of the individual learner and mediated through his or her individual frame of reference (Marsick, 2009).

### **Frames of Reference and Informal Learning**

Marsick et al.'s (2006) informal and incidental learning model portrays the process of informal learning. However, the complexity of context complicates the individual experience of informal learning (Cseh, 1999; Ellinger, 2005; Ellinger & Cseh, 2007; Lohman, 2006; Marsick, 2009). Each individual engaged in the informal learning process is situated in, and a part of the sociocultural environment of the workplace. Additionally, each individual has a complex set of values and beliefs that form his or her frame of reference (Hoekstra et al., 2009). The informal learning process is mediated through one's individual frame of reference, which may influence outcomes of informal learning (Ganter & Yeakel, 1980; Hoekstra et al., 2009; Jarvis, 2006; Kolb, 1984; Lewin, 1974; Marsick, 2009; Merriam & Caffarella, 1999; Vygotsky, 1978).

#### **Theoretical and conceptual literature on frames of reference.**

***Sociocultural theory and frame of reference.*** Vygotsky (1978) viewed individual development along four lines interwoven into the individual social and cultural environment.

*Ontogenetic* development reflects the gradual change an individual undergoes, such as in thinking or behavior, over time such as through high school or during one's life span.

*Phylogenetic* development is conceived as the slowly changing aspect of the human species, thereby leaving a legacy for subsequent generations. *Sociocultural* development is attributed to the social landscape that is a part of an individual's development, which furnishes tools and symbols used in social interaction and meaning making. Finally, microgenetic development is the moment-to-moment learning and development that occurs in an individual's engagement with lived experience. *Microgenetic* development is founded on the phylogenetic and sociocultural backdrop of nature and nurture, contributing to one's ontogenetic development (Cole, 1996; Rogoff, 1990; Vygotsky, 1974).

This sociocultural lens considers each experience of the individual and society as contributors to an individual frame of reference. Individual frames of reference are socially constructed filters by which one interprets and engages in situational meaning making and problem solving, as a part of lived experience (Rogoff, 2003; Taylor, 2008; Wertsch, 1990). The informal learning process is co-evolving with the problem solving and meaning making processes of individuals, as part of the microgenetic development of individual frames of reference (Cole, 1996; Marsick, 2009; Marsick & Watkins, 1990; Mezirow, 2000).

Mezirow (2000) suggested that, "A frame of reference is a meaning perspective, the structure of assumptions and expectations through which we filter sense impressions" (p. 16). He asserts that, "It [frame of reference] involves cognitive, affective, and conative dimensions. It selectively shapes and delimits perception, cognition, feelings and disposition by predisposing our intentions, expectations, and purposes" (p. 16). Frames of reference are composed of two

dimensions, *habits of mind* and *points of view*. Habits of mind are broad, orienting, habitual ways of thinking. Points of view are the articulations derived from one's habits of mind, such as beliefs, attitudes, and values that shape interpretations of lived experience (Garrick, 1998; McNally et al., 2009; Mezirow, 1997, 2000; Owen, 2009).

Similarly, Bourdieu identified "*habitus*" as a system of lasting, transposable dispositions which, integrating past experience, functions at every moment as a matrix of perceptions (Bourdieu, in Cole, 1996). Habitus corresponds with the concepts presented by Mezirow (1997) regarding one's frame of reference. Further, Bourdieu indicated that "habitus" [frame or reference] was assumed to take shape as an implicit aspect of habitual life experiences and constituted one's, usually unexamined, background set of assumptions about the world (Bourdieu, in Cole, 1996).

The tacit nature of one's frame of reference was implicated as problematic in the study of individuals returning to the workforce after a period of absence. The participants framed experiences, and skills acquired through such non-work settings as childcare, managing a home, or personal travel, as non-transferable competencies to the work place since they acquired them in another environment. Findings indicated that such implicit frames of reference were detrimental to the productive use of resident skills and were mitigated by surfacing the erroneous frames of reference through reflection (Evans & Kirsch, 2004; Marsick & Watkins, 1990). In another study, the embedded perception of the environment predicated specific activities and influence the individual learning (Hoekstra et al., 2009). The tacit nature of knowledge was identified as an impediment to transferring of knowledge to others. Further, such tacit models

shaped how one perceived the world around them (Hoekstra et al., 2009; McNally et al., 2009; Nonaka, 1991).

***Perspective, perception, and frame of reference.*** Some studies that are applicable to the character of frame of reference use the term *perception*, or *perspective* while clearly demonstrating the aforementioned earmarks of habits of mind and points of view. Such studies delineate the variation of frames of reference in organizations (Boud & Solomon, 2003; Owen, 2009), educational environments (Hoekstra et al., 2009; Lohman, 2006; McNally et al., 2009), and medical practices (Starr & Conley, 2006; White et al., 2000). Jarvis (2006) considered perception to be a mental state that occurred as a result of the transformation of sense data received by individuals. This indicated that such data had been interpreted and embedded in one's mental models and scripts as a part of one's sociocultural development (Cole, 1996). Fenwick (2006) used the term perspective to refer to various theoretical positions on learning, indexing a "point of view" based on the ideological and theoretical structures of these concepts.

***Identity and frame of reference.*** Other studies used the term *identity* to refer to the characteristics of an individual frame of reference (Mezirow, 2000). Fenwick (2006) referred to identities held by workers and of the process of constructing *social identity* within the workplace (Korte, 2009). Billett and Pavlova (2005) followed the transition of participants' identities in their endeavor to become ratified *employees* in various workplaces. From the various scholars, one may recognize that individuals may hold *multiple identities* concurrently (Billett & Pavlova, 2005; Fenwick, 2006; McNally, 2009; Talmy, 2008). Bucholtz and Hall (2005) have defined identity as "the social positioning of self and other" (p. 586). Identity is considered the means by

which one defines him or herself or views by which others categorize him or her (Bucholtz & Hall, 2005; Fenwick, 2006; McNally et al., 2009; Shinner, 2008).

The relationship of identity to individual frames of reference is that consistent with one's *identity*, one has *frame of reference*. Through one's frame of reference, one filters sensory input supported by habits of mind, and fosters points of view, resulting in interpretation, judgments, and action (Goodwin, 2007; Fenwick, 2006; Marsick, 2009; Mezirow, 2000; Wortham, 2008). Identity addresses the ontological question of, 'Who am I?' (Ardichvili & Kuchinke, 2009), frame of reference addresses the epistemological question of, 'How do I see and respond to the world based on my ontological position?' (Mezirow, 2000). The relationship of identity to frame of reference is indexed by the *stance* one assumes in a social engagement (Goodwin, 2007; Jurasaitė-Harbison, 2009; Ochs, 1992; Talmy, 2008; Wortham, 2008).

Identity and frame of reference are both considered dynamic because they may be transformed. However, one may undergo a frame of reference transformation without an identity transformation (Bucholtz & Hall, 2005; Fenwick, 2006; Mezirow, 2000; Nasir, McLaughlin, & Jones, 2009; Wortham, 2008). One who experiences an identity transformation must also experience a frame of reference transformation. Finally, association with a specific identity or frame of reference is socially negotiated and individually interpreted (Cole, 1996; Fenwick, 2006; Rogoff, 2003). One may consider him or herself, and be considered by others, to be associated with a particular identity thus, stereotypically relegated to a specific frame of reference (Reyes, 2006). However, one's frame of reference is situated in a sociocultural backdrop and individually acted out to the limits of individual agency (Lave & Wenger, 1991; Marsick, 2009; Nasir, et al., 2009; Shinner, 2008).

Frames of reference are associated with an individual's *personal identity*, as well as his or her *social identity*, across various social contexts. One's interaction in the social context both influences the field, and he or she is influenced by the field, in a mutual development of a frame of reference (Cole, 1996; Jarvis, 2006; Jurasaitė-Harbison, 2009; Lewin, 1974; Mezirow, 2000; Senge, 1990; van Manen, 1990). An individual's frame of reference shapes his or her foundational understanding of problems, environmental context, and predisposes his or her interactions with situations and events that are encountered as a part of daily life (Cseh et al., 2004; Hoekstra et al., 2009; Jarvis, 2006; Mezirow, 2000; Nonaka, 1991; Senge, 2006).

***Dynamic and/or static states of frames of reference.*** Marsick, Volpe, and Watkins (1999), indicated that the extensive influence of context was integrated in every step of the process of informal learning. They clarified the idea of "context" stating that it was the "lens" (p. 87) through which the participant's saw their world; thus, providing a frame of reference to respond to the "critical incidents" and "learning experiences" (p. 87) which they encountered. The identification of this transformative informal learning process, interwoven with the continual evolution of an individual's frame of reference, supports the argument that both the informal learning process and individual frame of reference development are dynamic in nature (Dewey, 1938; Jarvis, 2006; Kolb, 1984; Marsick et al., 1999; Mezirow, 2000). At a given moment, one may capture the still image of an individual frame of reference; however, with the continuously negotiated nature of meaning and sense-making, one encounters only the static representation of a dynamic process (Jarvis, 2006; Lewin, 1974; Rogoff, 2003; Schwandt, 2005).



Recently, Ardichvili and Kuchinke (2009), writing about changes in work, referred to the nature of the construction of one's work identity. They indicate that the development of one's conception, and meaning of work, is a dynamic process wherein, meanings are constructed in context and influenced by situational factors. Approaching the meaning of work from a constructivist "frame of reference," they indicate the development of one's work identity is an, "active process of meaning making" (p. 170). This represents the fluid nature of constructing identity, or understanding of the meaning of work, correlating to the construction of an individual frame of reference, habits of mind, and points of view in the development of such meaning structures (Mezirow, 1997, 2000). The generally accepted tenants of constructivism lend themselves to being held as paradigm, in that it serves as an overarching framework for a larger population in a specific discipline (Schwandt, 2001).

**Research on frames of reference.** Hodkinson and Hodkinson (2003) qualitatively studied the learning experience of a secondary level art teacher who was also the head of a three-person department. They advocated for the inclusion of an individual's *disposition* toward learning as a critical factor in understanding and research on learning in the workplace. Their findings further asserted that individuals engage in experience other than in the workplace and have histories that contribute to the development of individual frames of reference. This frame of reference influenced how individuals approached learning and participation within communities of practice (Hoekstra et al., 2009; Lave & Wenger, 1991; Rogoff, 1990, 2003).

This line of thought is congruent with the work of Vygotsky (1978) and other scholars in illustrating the importance of the sociocultural aspects in learning (Cole, 1996; Marsick, 2009; Rogoff, 2003). Scholars contend that the interaction of society, culture, social history, and the

individual are interwoven rather than mutually influenced by spheres. This emphasizes the importance of considering the contributors to one's perception of the world and individual formation of a frame of reference. One's frame of reference situates him or her in a learning environment as a part of the context of informal learning (Cole, 1996; Hoekstra et al., 2009; Lave & Wenger, 1991; Marsick, 2009; Mezirow, 2000; Owen, 2009; Rogoff, 2003).

In considering the term, *disposition*, Hodkinson and Hodkinson (2003), appeared to use it in the sense that it referred to the attitude of the individual regarding a given problem or situation. Perception has been used by scholars to identify one's beliefs regarding some situation or phenomena (Jarvis, 2006). The terms disposition and perception may be included in a definition of one's frame of reference representative of habits of mind and points of view. These represent the underlying beliefs, values, and understandings that form how one gives meaning to his or her world (Jarvis, 2006; Lave & Wenger, 1991; Mezirow, 2000). Ruth-Sahd and Tisdell (2007) have indicated that intuition, demonstrated by novice nurses, was influenced by prior experience by which individuals responded to given situations or triggers based on an intuitive understanding or inclination. These intuitive responses represent the accumulation of informal and incidental learning, both explicit as well as implicit, providing an individual with a frame of reference of a setting or situation (Gola, 2009). The response of the individual to address the situation would lead to an informal learning opportunity couched in their existing frame of reference.

In another study, nurses indicated that they believed that the reason for the implementation of new technology was an economic decision that would lower staff requirements instead of improving patient care (White et al., 2000). Perceptions such as these

have resulted in a negative influence on a number of workplace issues such as job satisfaction, perceived learning opportunities, as well as changing one's perception about the core roles and responsibilities in the workplace (Boud & Solomon, 2003; Jurasaitė-Harbison, 2009; Reardon, 2004; White et al., 2000). One's frame of reference in the workplace may have either positive or detrimental effects both on the individual and on the organization (Boud & Solomon, 2003; Marsick, 2009; Senge, 1990; 2006). Individual frames of reference can affect team performance (Anderson, 2005), the development of new skills, the implementation of prior knowledge (Evans & Kersh, 2004), and determines outlooks on learning, power, and work (Gola, 2009; Jarvis, 2006; Hoekstra et al., 2009; Lave & Wenger, 1991; Marsick, 2009; Senge, 1990; Starr & Conley, 2006; White et al., 2000).

One study indicated that workers resisted workplace learning and being labeled as learners in the workplace. This resistance was based on a frame of reference held by the participants that assigned an inferior status to learning and learners as incompetent and unequipped (Boud & Solomon, 2003). Other studies have disclosed how individual frames of reference predicated responses to workplace changes or how teachers selected teaching strategies (Hoekstra et al., 2009; McNally et al., 2009; Owen, 2009; White et al., 2000), and how managers approached learning based on points of view and habits of mind (Mumford, 1996).

The reciprocal transformation of one's frame of reference through engaging in an informal learning process has been represented in the literature by studies that have examined the role of managers as facilitators of informal learning (Ellinger et al., 1999; Ellinger, 2005). Senge (2006) stated that the development of a learning organization requires the alignment of the members of the organization at every level. Scholars have addressed the effectiveness of

managers and leaders as disseminators of organizational goals and values through facilitating informal learning, thus transforming the individual sense-making activities of organizational members (Billett & Pavlova, 2005; Ellinger et al., 1999; Lave & Wenger, 1991; Marsick, 2009; Schwandt, 2005).

Evans and Kersh (2004) found that tacit knowledge was often the result of learning gained outside the current workplace setting, informally or incidentally, as a part of the individual's everyday experience. They found that surfacing tacit knowledge had a transformative effect on the participants, altering their frame of reference of what constituted ratified learning and knowledge. Individuals engage in transformative informal learning and frame of reference development as a part of a co-constructive process of learning and development daily, inclusive of the workplace environment (Jurasaitė-Harbison, 2009; Marsick, 2009; McNally et al., 2009).

Scholars contend that individuals manifest a frame of reference toward learning, which is developed and evolved through the experiences and interactions within the learner's lived experience (Hodkinson & Hodkinson, 2003; Jarvis, 2006; Jurasaitė-Harbison, 2009; Lave & Wenger, 1991; Marsick, 2009; Nonaka, 1991; Mezirow, 2000). These frames of reference orient the learner when faced with an informal learning opportunity. Since no two people frame events and opportunities in the same way, each individual may interact with a learning opportunity differently (Hoekstra et al., 2009; Hodkinson & Hodkinson, 2003; Jarvis, 2006; Lave & Wenger, 1991; Polanyi, 1964). Meaning is individually constructed from the interpreted events and situations of one's life experience (Jarvis, 2006; Lave & Wenger, 1991; van Manen, 1990). Therefore, one's framing of events and situations in the environment may be significant to

understanding his or her learning orientation, response to a trigger, and the influence of an individual frame of reference on the process of informal learning.

**Frames of reference and informal learning.** The construction of meaning of one's surroundings, environment, interactions, and individual experience shapes how one perceives information, factoring into how he or she responds to experience as filtered through his or her individual frame of reference (Boud & Garrick, 1999; Boud & Solomon, 2003; Dewey, 1938; Jarvis, 2006; Marsick, 2009; Merriam, Caffarella, & Baumgartner, 2007; Mezirow, 2000). The domains of informal learning and frames of reference are entwined in the co-constructive process of individual learning and development (Cole, 1996; Jurasaitė-Harbison, 2009; Marsick, 2009; Mezirow, 2000; Rogoff, 2003).

Transformational learning, according to Mezirow (2000), is the process whereby one engages in a critical reflective process, transforming his or her frame of reference, and consequently altering how he or she engages experience. Marsick, Volpe, and Watkins (1999) addressed the relationship of transformational learning to informal learning and frames of reference, by stating that individual frames of reference are composed of, "psychological, political, social, cultural, economic, or epistemological" (p. 93) tenants of individuals. Further, they indicated that one's frame of reference influences the choices and decisions he or she makes. Yet, how this actually occurs relative to the process of informal learning remains under developed in the informal learning literature.

Scholars have argued that individuals are both influenced by the context of the learning situation, and likewise influence the context with which they are associated (Cole, 1996; Jurasaitė-Harbison, 2009; Hodkinson & Hodkinson, 2003; Marsick, 2009; Vygotsky, 1978). The

convergence of frames of reference and informal learning is inferred at the intersection of the reciprocal effect of each domain on the other, in which neither is subordinated. The process of informal learning is informed, engaged, interpreted, and influenced by one's frame of reference; while one's frame of reference, as the product of one's experience, is transformed by engaging in an informal learning process (Cole, 1996; Rogoff, 2003; Marsick, 2009; Mezirow, 2000). While there has been some research done on frames of reference, the interaction and influence of frames of reference in the informal learning process has been under-researched.

In summary this literature review has highlighted the importance of the individual's frame of reference as a significant factor in the informal learning process as he or she engages with a new learning opportunity. However, while some research has focused on frames of reference in the workplace, little research has considered the intersection of individual frames of reference with the informal learning process. This omission illustrates the lack of focus on the critical nature of the individual's frame of reference and its influence on the process of informal learning. Assessing the influence of frames of reference is particularly important given the convergence of experiential learning, dynamic field theory, and informal learning, illuminated by a sociocultural approach to understanding learning and development. How one frames a given situation or problem is particularly important as it dictates the individual's orientation and response to other phases of the informal learning process (Cole, 1996; Cseh et al., 1999; Dewey, 1938; Lewin, 1974; Marsick, 2009; Marsick et al., 2006; Polanyi, 1964; Rogoff, 2003; Vygotsky, 1978).

## Chapter Summary

Embedded within experiential learning, set in the context of the field as the holistic expression of the sociocultural environment of the individual, informal learning provides a practical lens to understanding the learning of individuals, particularly in the workplace (Boud & Garrick, 1999; Eraut, 2004; Jarvis, 2006; Marsick, 2009; Marsick et al., 2006; Marsick & Watkins, 1990). Studies on informal learning have focused predominantly on the individual's perception of learning (Boud & Middleton, 2003; Boud & Solomon, 2003; Cseh, 1998; Starr & Conley, 2006; White et al., 2000), how individuals develop strategies through informal learning (Mumford, 1996; Sloan, 2002), the facilitators and inhibitors of informal learning (Ardichvili et al., 2003; Billett & Pavlova, 2005; Ellinger & Bostrom, 2002; Lohman, 2006; Lohman & Woolf, 2001), and characteristics of informal learning in the workplace environment (Watkins & Cervero, 2000; White et al., 2000; Williams, 2003).

A limited number of studies have begun to examine context or the environment and scholars have indicated that there is a compelling need for further research on the influence of context on the process of informal and incidental learning (Cseh, 1998; Ellinger et al., 1999; Ellinger, 2005; Marsick, 2009; Marsick et al., 2006). However, recent research efforts focused on context have tended to limit the context to the workplace setting without considering the broader issues of the social setting, historical underpinnings, and external environmental issues that are interwoven and influence one's frame of reference (Ellinger, 2005; Marsick et al., 2006; Mezirow, 2000).

The importance of an individual's frame of reference has not been well researched and how it influences informal learning has not been well researched as only a few studies have

explored how individuals frame the learning experience retrospectively. However, informal learning is shaped by individual experience, formed in a sociocultural context, and is influenced at the foundational level by one's frame of reference (Cseh et al., 1999; Lave & Wenger, 1991; Marsick, 2009; Marsick & Watkins, 1990; Mezirow, 2000). Understanding individual informal learning can best be facilitated by examining the spheres of influence that are interwoven into the fabric of individual lived-experience. These spheres of influence have shaped an individual's understanding of his or her world forming frames of reference, which provides an orientation for the individual in the informal learning process. Therefore, one's frame of reference may influence the process, participation, and outcomes of informal learning making this intersection of particular interest for understanding individual learning in the workplace and enabling scholars to develop a more holistic understanding of this phenomenon (Hodkinson & Hodkinson, 2003; Jarvis, 2006; Lave & Wenger, 1991; Marsick, 2009; Mezirow, 2000).



## **Chapter 3**

### **Design of the Study**

The purpose of this study was to examine the influence of individual frames of reference on the informal learning process. Specifically, this study sought to identify individual frames of reference and examine how individuals interpret and respond to the challenges that they encounter in their daily work experience through the process of their informal learning.

#### **Overview of Research Design**

A qualitative instrumental case study approach was chosen as the most suitable design to develop an understanding of the informal learning process that individuals engage in as a part of their daily experience in the workplace (Bogdan & Bilkin, 2003; Gall et al., 2003; Stake, 1995, 2006; van Manen, 1990). As a fine-grained naturalistic approach, the researcher was provided with a means of examining how individuals engaged with non-routine situations and events encountered in the workplace. Further, this approach allowed an examination of the influence of individual frames of reference on the informal learning process (Bogden & Biklen, 2003; Emerson, 2001; Gall et al., 2003; Stake, 1995, 2006; van Manen, 1990).

The research question which guided this study was: How do frames of reference influence the informal learning process?

#### **Research Setting**

A substantial base of literature indicates that much of the learning that occurs in the workplace is attributed to informal or self-directed learning (Boud & Middleton, 2003; Casey, 1999; Ellinger, 2004; Marsick, 2009; Marsick & Watkins, 1990, 2001; Williams, 2003). Marsick and Watkins (1990) indicated that informal learning was likely to become a resource when the

environment fostered non-routine situations that confronted the individual. Aviation training is replete with non-routine opportunities generated by the variability of the subject matter, complexity of learning to fly an airplane, the dynamic atmospheric conditions, and aircraft mechanical issues. In this highly interpersonal educational and workplace setting, sociocultural complexity and individual student-instructor dynamics, provide additional instability to the environment (Cangelosi & Dill, 1965; Cheetham & Chivers, 2001b; Cope & Watts, 2000; Lohman & Woolf, 2001; Marsick, 2009). Therefore, an aviation training setting represented an optimal research setting for this study. Specifically, an aviation educational program at one midwestern university was deemed suitable for this study.

The university aviation program averages an enrollment of 300 students each semester in various flight course offerings. The instructional staff consists of about 50 certified flight instructors varying in experience from newly certified flight instructors to a small percentage (less than 10%) with more than 10 years of experience as a flight instructor. The major portion of the instructional staff lies between these two extremes with an experience level of 1 to 3 years as an aviation flight instructor. Most of the mid-level instructional staff members are graduates of the flight program of the university.

Each semester the university aviation program, under the authority of the Federal Aviation Administration (FAA), certifies a number of students (15 to 25) as Certified Flight Instructors (CFI). These newly certified instructors have successfully completed the required course and practical test requirements as set forth in the FAA approved training curriculum. These instructors then have an opportunity to participate in a practice teaching course as a part of the undergraduate curriculum.

During the practice teaching course these instructors are assigned one to two primary students. These instructors are responsible for each student's aviation flight training along with some limited ground instruction in a course of study leading to Private Pilot Certification. Although aviation flight training generally requires an extensive amount of general knowledge concerning various aspects of the flight environment such as aerodynamics, weather, navigation, and aircraft systems, much of this information is taught in ground school courses. The ground school courses are typical classroom settings facilitated by experienced instructors with 20 to 30 students per class. The newly certified flight instructors do not directly participate in these ground school classes, but provide supplemental individual support of the knowledge requirements for their assigned students. These flight instructors are directly responsible for the one-to-one flight instruction in the university's training aircraft. These flight instructors are responsible for developing the skills and abilities of their assigned students to become certified pilots. These newly certified flight instructors meet twice a week in a classroom setting as a part of the practice teaching course. Additionally, they are assigned to a senior instructor from whom they are to receive assistance and to whom they are accountable during this initial period.

During aviation CFI training, students receive specific formal course work that includes learning theory, lesson development, and practice teaching for aviation instructors. Prior to being certified as CFI, candidates must satisfactorily complete a practical test demonstrating both ground and flight instructional competence. The purpose of the practice teaching course is to facilitate the new instructor's transition from student to instructor responsibilities. These classes, CFI and Practice Teaching, are traditional formal classroom courses. The faculty members, who

facilitate these courses, are experienced aviation flight and ground instructors with an extensive background in commercial aviation and aviation training.

Newly certified instructors receive a brief formal orientation to the procedures and processes of doing business in, and teaching within, the university aviation program. The bulk of their learning is left to gaining insights through their own experience, self directed study, and other informal learning opportunities (Lohman & Woolf, 2001; Marsick & Watkins, 1990, 2001; McNally et al., 2009). Having completed the practice teaching course, many of these instructors continue to teach as part-time employees of the university aviation program.

Aviation flight instructors face the complexity of variable atmospheric conditions and highly technical skill and knowledge development in the small confines of the airplane cockpit. This cockpit defines their primary classroom, and work environment. The prevalence of face-to-face, one-on-one instruction also complicates the workplace setting and the learning environment through the dynamic interpersonal relationship of the instructors and students which foster non-routine situations and provide an excellent setting for this study on the influence of frames of reference on informal learning (Marsick, 2009; Marsick & Watkins, 1990).

### **Participant Selection**

For this instrumental case study, ten recently certified flight instructors were invited to participate based on a purposeful intensity sampling design. These individuals were selected as participants because, as novice instructors, they were likely to be information rich cases which allowed for an in-depth investigation of the influence of frames of reference on the informal learning process through non-routine events and situations (Gall et al., 2003; Marsick & Watkins, 1990; Patton, 1990, 2002). The criteria for the selection of these flight instructors were

completion of their course work through the university aviation program and certification by the FAA. Further, they must have participated in the practice teaching course and completed a learning journal as a part of the university curriculum. To provide optimum access to non-routine events and situations, the participants must have been engaged in teaching for less than two years (Lohman & Woolf, 2001). Further, to insure adequate exposure to the aviation flight instructor environment, participants were selected from those having active teaching experience within the preceding six months. These selection criteria targeted participants who were comparatively at the novice level as flight instructors to insure information rich resources through engaging in non-routine situations being relatively new to the domain of teaching (Dreyfus & Dreyfus, 1986; Marsick & Watkins, 1990).

Each of the participants selected had participated in the practice teaching course and had completed the required learning journal. Through the practice teaching course and daily engagement of the researcher with potential participants in the workplace, the researcher had become familiar with each of the participants and was aware of the challenges that were generally faced by these novice instructors. Additionally, by reviewing the participants' learning journals, challenges were illuminated which signaled the probability of participants' engagement in informal learning and forthcoming rich data.

By purposefully selecting these participants with recent, but limited, experience in the field, information rich data were obtained by soliciting clear recollections of how these instructors framed the environment and came to understand their experiences. This provided opportunities for examining the influence of individual frames of reference on the informal learning process as a part of their early instructional experience (Emerson, 2001; Lohman &

Woolf, 2001; van Manen, 1990). The selection of instructors who had completed their certification through the university aviation program provided a common formal educational basis to allow for a focus on the individual variation and complexity of individuals' informal learning processes.

### **Biography of the Researcher**

The researcher was employed as an instructor in the university aviation program and had more than forty years of flight instruction experience in a variety of settings. The researcher facilitated the practice teaching course interacting directly with the new flight instructors in the beginning of their instructional careers as a part of the researcher's faculty responsibilities. This positioned the researcher to act as an inside participant observer during the early learning experience of these instructors (Emerson, 2001; Stake, 1995). Further, the researcher was immersed in the setting of this study by his employment in the aviation education program coupled with longevity in the field of aviation. Additionally, the researcher had a vested interest in the study of informal learning through his personal interest and his engagement with the participants as an educator (Bogden & Biklen, 2003; Emerson et al., 1995; Emerson, 2001; Gall et al., 2003; van Manen, 1990).

This position posed certain advantages to the researcher such as familiarity with the environment, participants, requirements, and objectives which provided insider knowledge and access. However, the researcher's familiarity with facets of aviation and the setting also presented challenges through perceived common understandings between the participants and the researcher, potentially leading to assumptions about meaning and omissions of detail. Additionally, assumptions and unidentified biases based on the researcher's assumptions and

beliefs founded on personal experience posed another aspect of caution during data collection and analysis characteristic of the qualitative paradigm. These issues were addressed during data collection and analysis through member checking to ensure reliability and validity of the data for this study (Gall et al., 2003; Patton, 2002).

### **Approaches to Data Collection**

Data collection was facilitated through a variety of methods that included: participant observation, document review, and semi-structured interviews with each of the participants. Observation, document review and interview methods of data collection have been recognized as a primary means of gathering data in qualitative research (Denzin & Lincoln, 2000; Emerson, Fretz, & Shaw, 1995; Stake, 2006). Observation was conducted in the training facility prior to engaging with the participants and continued throughout the research process as an information rich resource that situated the participants in workplace environment (Emerson, Fretz, & Shaw, 1995, Stake, 2006). Document review included examining organizational documents and participants' learning journals to gain insight into the context and individuals' experience of the workplace and workplace responsibilities to illuminate the experience of the flight instructors engaged in their early teaching responsibilities (Denzin & Lincoln, 2000; Gall, Gall, & Borg, 2003; Patton, 2002; Stake, 19995). Face-to-face semi-structured interviews were developed and conducted with all the participants. These interviews primarily explored the participants' frame of reference development and illuminated their early teaching experience as they encountered problems and challenges that stimulated their informal learning. The interviews also enabled the researcher to further examine issues identified through the observations and document review process (Gall, Gall, & Borg, 2003; Kvale, 1996).

**Participant observation.** Observations were conducted in the office areas, classrooms, and dispatch areas of the university aviation facility to gain insight in the organizational environment of the participants to descriptively situate them in this unique workplace context (Stake, 1995). Observation provided initial impressions of the environment, identified key events that were general to the flight instructors, and illuminated issues that were to be expanded upon during the interview process (Emerson, Fretz, & Shaw, 1995). Observations were recorded as field notes to provide a descriptive representation of the workplace environment, illustrate typical opportunities and challenges posed by the workplace, and observation of the formal and informal support systems and facilities available to the instructional staff (Emerson, 2001; Emerson, Fretz, & Shaw, 1995). These observations provided illustrations of situations and environmental concerns that instructors typically encountered in their instructional duties. Such events and situations acted as disjunctures and became triggers that fostered informal learning opportunities (Jarvis, 2006; Marsick & Watkins, 1990). Considering such events and situations provided information rich resources allowing identification and examination of the participants' frames of reference during this study.

**Document review.** Organizational documents and records, including policy manuals, training publications, and other public materials, were examined to illuminate the organizational policy, structures, and support that were available to flight instructors and students in the university aviation program (Stake, 1995). A page by page examination of these manuals, publications, and materials was conducted to identify resources that were provided to support the development of the new instructors and to identify organizational policies and procedures set forth to govern operations. These documents provided insight into the training of new



instructors and illuminated available information resources provided by the organization. This review identified, organizational, independent, and informal support resources that were available in this workplace context (Bogden & Biklen, 2003; Gall, Gall, & Borg, 2003).

Individual participant learning journals, which represented the articulation of the personal journey of the participants in their early teaching experience were examined. These learning journals were submitted during their participation in the practice teaching course. Each of the participant's learning journal was examined to identify situations and events which acted as triggers to informal learning. Some of these situations were explored during the interview process (Bogden & Biklen, 2003; Gall et al., 2003; Stake, 1995; van Manen, 1990).

**Interviews.** Semi-structured face-to-face interviews with each participant were the main data source (Stake, 2006). These interviews were designed to gain insight into the development of the participants' frames of reference through a biographical account to illuminate their frame of reference development formed in their personal history. This was coupled with an exploration of events and situations that the participants encountered during their early teaching experiences which provided an opportunity to examine their engagement with informal learning. The influence of individual frames of reference on the informal learning process was illuminated as the participants identified the reasonings and resources utilized in resolving or coming to understand the various situations (Bogden & Biklen, 2003; Emerson et al., 1995; Emerson, 2001; Gall et al., 2003; Kvale, 1996; Marsick & Watkins, 1990; Stake, 1995; van Manen, 1990).

Important to this case study is the place that narrative occupies as a data source. The objective of a case study is to look deeply into a particular case to gain a deep understanding of the particular case. One's understanding and recollection of experience is often constructed of narrative

fragments and composed of a collection of stories which form the individual imprint of their understanding of lived-experience (Clandinin & Connelly, 2000). Therefore, the personal narratives of the early developmental and flight instruction experiences of participants' were the dominant data source in this instrumental case study as articulated within the semi-structured interviews. These interviews were audio taped and transcribed verbatim for the purpose of analysis (Kvale, 1996; Stake, 1995).

### **Data Collection Procedures**

**Participant observation.** The process of data collection began with observation in the facilities of the aviation education program including the office areas, classrooms, and dispatch areas utilized by the flight instructors. This observation continued throughout the research study which enabled the researcher to become aware of the various support, interaction, events, and situations that defined the participants' workplace environment.

**Document review.** Along with observation, organizational documents were examined to identify the training and support that instructors were provided, and the policies that the flight instructors were responsible to comply with. These organizational documents were periodically reconsidered as they intersected with the accounts of the articulation of the participants' early teaching experience. Additionally, the learning journals of selected participants were reviewed to identify events and situations to be explored in more depth through the semi-structured interviews.

**Interviews.** To develop an understanding of the participant's individual frame of reference, each participant was asked to provide a biographical account (Hodkinson & Hodkinson,

2003). The various areas known to influence individual development derived from the literature were addressed through open ended questions as a base of exploration (Kvale, 1996).

To establish a point of entrance for investigation of the informal learning process, four conceptual gateways were identified to access information rich data from the participants. These gateways were conceptual points of entry into the lived experience of these flight instructors through an event or a situation that stimulated the participants' informal learning (Kvale, 1996; Marsick & Watkins, 1990).

The first gateway was through the participants' learning journals which were required of the instructors as a part of the practice teaching course. During this course, these instructors were directed to record their thoughts and insights including the problems which they encountered in their learning journals. Each journal was reviewed by the researcher to identify an event or situation which the participant had referred to which appeared to provide a challenge to the participant's existing frame of reference, potentially fostering a trigger for informal learning. Such events or situations were investigated during the semi-structured interviews to clarify and expand on the various facets that the participant illuminated as a part of the process of resolving a problem or coming to understand the event or situation (Cseh et al., 1999; Jarvis, 2006; Kvale, 1996; Marsick, 2009; Marsick & Watkins, 1990; Marsick et al., 2006). Several episodes were identified through this gateway.

The second gateway was through observation of the participant engaged in activities normally associated with instruction which illustrated a non-routine experience. These observations were to be followed by an interview to explore the participant's perspective of the event or situation (Emerson et al., 1995; Kvale, 1996). However, there were no such instances

observed during this study. This might have been because of the nature of the flight training environment in which the instructors often met face-to-face with their respective students on varied schedules; therefore, the availability for specific observation of instructor/student interaction was limited.

The third gateway utilized was through direct questioning of the participant during the interview. Participants were asked to delineate and expand on an event or situation that they encountered with a student which required a new approach or strategy rather than a routine response (Kvale, 1996). This approach provided a number of narratives of events in which the participants expressed how the process of learning and development coincided with the efforts to develop a solution to a problem or understand a situation.

In the fourth gateway, examples were provided to the participants based on the researcher's personal experience or by illustrating typical events or situations intending to generate participant accounts of similar experiences. This approach was found to be leading which produced questionable results and failed to provide the desired rich data. Therefore, this approach was discontinued immediately at the onset of this study.

A suitable event or situation was considered to be an instance in which the participant was confronted with a situation or problem that required response in an effort to understand or resolve a situation or problem (Jarvis, 2006; Marsick, 2009; Marsick & Watkins, 1990). Such instances included specific learning difficulties of students, attitude or motivational problems, interpersonal differences between instructors and students, and organizational requirements. Such instances acted as triggers that catalyzed the informal learning process for these participants in concert with the informal learning literature (Marsick, 2009; Marsick & Watkins,

1990; Marsick et al., 2006). By following the process of the participants' informal learning to resolve their students' learning problems, the intersection of their informal learning and frames of reference could be examined.

These instances provided the opportunity to explore the experience of the participant and his or her informal learning process at three conceptual levels of understanding and meaning during the interviews (Table 1). Based on these levels the researcher proceeded to identify individual frames of reference and their influence on the informal learning process.

Table 1

*Analysis Level*

Level of Analysis	Information Description
Level I. Historical Narrative	Information was represented as the historical narrative of the engagement of an incident or instance that the participant encountered.
Level II. Cognitive/Experimental	Information based on previous experience and identification of these experience linkages. This represented the narrative of strategy development and construction of meaning for the participant when confronted by a non-routine engagement.
Level III. Awareness/Consciousness	Information provided access to examining the participant's development of the frame of reference at the intersection with her or his informal learning. At this level, a frame of reference as illuminated through individual biography was connected to his or her informal learning process to examine the interaction.

In-depth semi-structured face-to-face interviews were conducted with each participant to explore the participant's biography and various events and situations encountered by the participant's during his or her early workplace experience. The exploration of these events and situations provided an opportunity to capture the emic representation of the intersection of the participant's frame of reference with his or her informal learning process (Bogden & Biklen, 2003; Emerson et al., 1995; Emerson, 2001; Gall et al., 2003; Kvale, 1996; Marsick & Watkins, 1990; Stake, 1995; van Manen, 1990). The interview process required as many as three

interview sessions with each participant lasting 40 minutes to 1 hour and 30 minutes per interview. These interviews were audio taped and transcribed verbatim for analysis (Kvale, 1996; Stake, 1995).

### **Data Analysis**

Patton (1990, 2002) has indicated that a key aspect of qualitative analysis is to identify threads in the data that demonstrate convergence. Convergence is a coming together of concepts, events, and ideas, from various places, and/or persons to build a comprehensive understanding of the phenomena. This convergence was of particular interest given the purpose of the study. The qualitative case study data were analyzed using constant comparative analysis until reaching a level of saturation in which no relevant categories or themes continued to emerge from the data across the ten participants (Bogden & Biklen, 2003; Emerson et al., 1995; Gall et al., 2003, Stake, 2006). This data collection and analysis process is depicted in Figure 7.

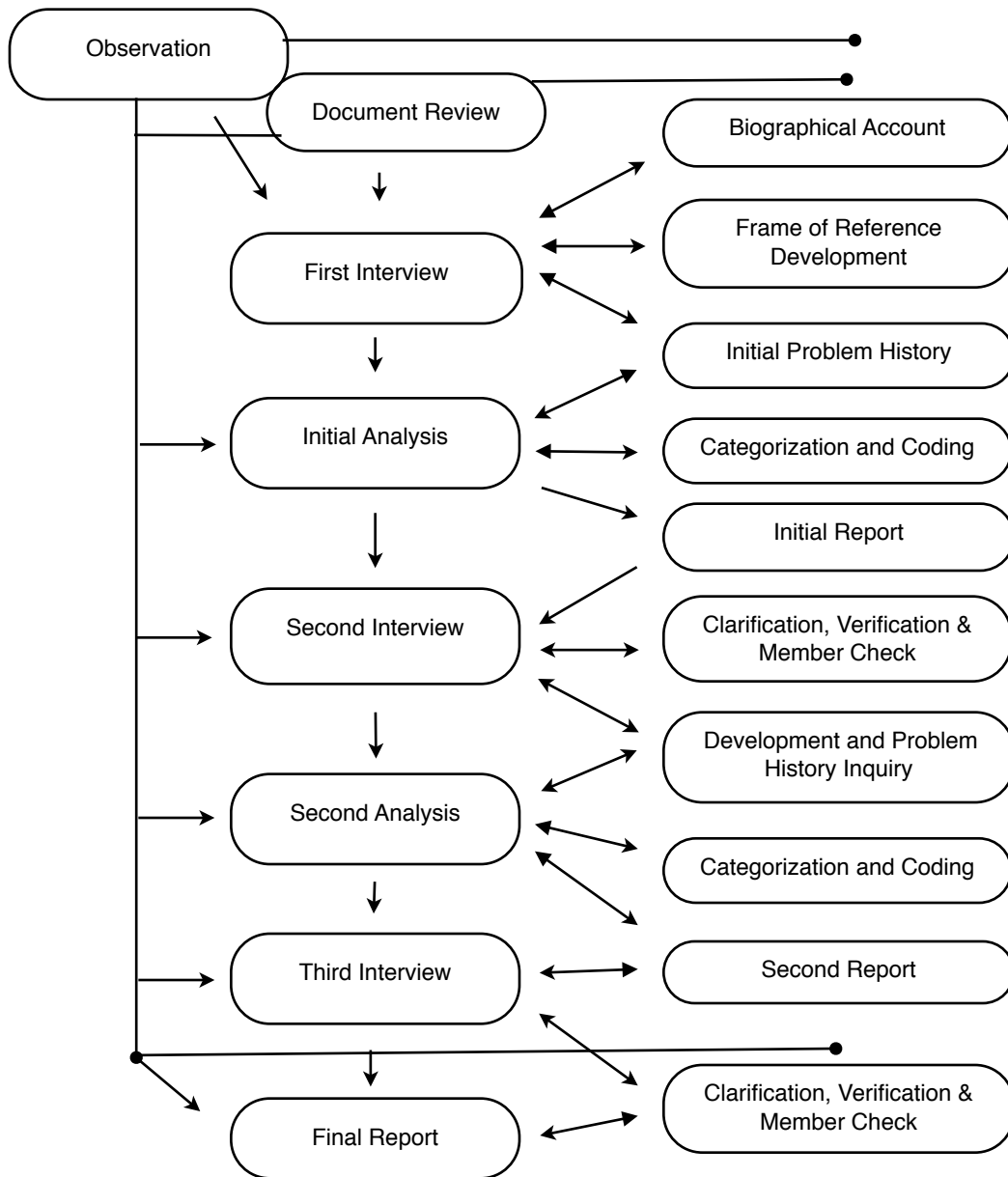


Figure 7. Data collection and analysis process.

Data were collected primarily through the articulation of stories and rich narratives during the semi-structured interviews with each participant. After the first interview an initial thematic analysis of the transcripts was conducted in which primary patterns and themes were identified in the data that were particular to each of the participants (Clandinin, Murphy, Huber, & Orr, 2010; Riessman, 1993). From the participants' individual narratives, specific themes

were identified that were aligned with predetermined categories drawn from the literature (Table 2), while specific emergent themes articulated by the participants, which failed to fit into predetermined category, were assigned to emergent categories (Table 3). The transcripts were also reviewed to surface areas that needed clarification and to develop additional questions for a second interview.

A second interview was conducted with eight of the ten participants. Two of the ten were not available for a second interview due to absence from the area for a short period of time. This was not deemed as critical to the study as all of the participants participated in the third interview. During this second interview, dominant themes were explored with questions posed to gain a deeper understanding of the experience of the participants. Additionally, an effort was made to insure that the preliminary findings and concepts of the first interview were complete, valid, and accurate according to the participants. The transcripts of both the first and the second interviews for each participant were analyzed through thematic and structural analysis in which the long narratives of the participants were broken into relevant sub-parts of the narratives to facilitate further analysis (Riessman, 1993). The sub-parts of the narratives were assigned an interpretive analysis in which each sub-part of the narratives of the participants was considered for a meaning framework (Clandinin & Connelly, 2000; Clandinin et al., 2010; Riessman, 1993). This interpretive analysis provided a structure that facilitated aligning each sub-part into categories and coding the data according to a predetermined set of categories drawn from the literature (Table 2) and to illuminate emergent categories (Table 3).

These narratives were further examined as categories and were cross-referenced with other categories both within each participant's transcript as well as across the categories of the



other participants to identify common themes. The themes were cross-referenced within and across other categories and themes of each of the participants individually and across all participants collectively (Patton, 2002). This process of constant comparative analysis was used to clarify the meaning of each category, to insure a sharp distinction between categories, and to identify other salient categories beyond those predetermined by the literature that emerged from the data. This provided evidence of theoretical and conceptual saturation of the categories by the failure of novel or emergent themes to continue to surface indicating that saturation had been reached for this study (Bogden & Biklen, 2003; Emerson et al., 1995; Gall et al., 2003; Patton, 2002; Stake, 1995). Emergent themes identified from the data were used to develop additional interview inquiry and further the research by explicating the influence of frames of reference on informal learning (Bogden & Biklen, 2003; Emerson et al., 1995; Gall et al., 2003; Kvale, 1996).

The following categories were identified in the literature which formed an initial foundational scheme for categorizing and coding the data for the purpose of identifying the development and utilization of individual frames of reference (Table 2).

Table 2

*Pre-identified Category and Code Definitions*

Category (Code)	Definition
Beliefs, Values and Religious Experience (BVR)	Beliefs represented the concepts, ideas, or understandings held by an individual and may represent what is true or real or reality for the individual. Values represented the assigned importance or conceptual understandings of behavior or thought of an individual. Religious experience represented those structures that have become a part of the meaning structures held by an individual as a result of a religious experience, perspective, or norm (Cole, 1996; Marsick, 2009; Marsick & Watkins, 1990; Mezirow, 2000; Rogoff, 2003).

(continued)

Table 2 (continued)

Category (Code)	Definition
Sociocultural Norms (SCN)	Sociocultural norms represented the outcomes of cultural and social influence that resulted in conceived normative behavior, feeling or ideas (Ellinger, 2005; Rogoff, 2003; Owen, 2009; Vygotsky, 1978).
Educational History (EH)	Educational history represented an individual experience founded on the historical context of formal education or that which was conveyed to the individual through the biographical history of those with whom they intersect as it contributes to the development of and utilization of one's frame of reference (Cole, 1996).
Family Experience (FE)	Family experience represented the direct experience and interaction within the family unit which shaped the development of the individual (Rogoff, 2003; Vygotsky, 1978).
Family History (FH)	Family history was a part of family experience but associated with the historical context that composed the norms and cultural-historical frames of the family unit (Cole, 1996; Rogoff, 2003).
Formal Educational Experience (FEE)	Formal education experience represented individual interaction in a specific formal educational setting as separate and distinct from non-formal educational setting, activities, and events (Cole, 1996; Dewey, 1938).
Institutional Experience (IE)	Institutional experience was experience that was attributed to involvement with an institution outside a formal educational setting such as military experience (Jarvis, 2006).
Perceived Place or Status (PS)	Perceived place or status was the influence attributed to one's perception of the place or status that was applicable to themselves in a given social setting (Rogoff, 2003).
Physical History and Experience (PH)	Physical history and experience represented the events, limitation and experiences of a physical nature (Lewin, 1974).
Social Engagements (SOC)	Social engagements were the social interaction and involvement with others both structured and unstructured which provided an influence on the development of meaning structures of an individual (Lave & Wenger, 1991; Mezirow, 2000; Rogoff, 2003).
Work Related Experience (WE)	Work related experience was the interaction of the individual in a work place setting displaying both the formation and utilization of frames of reference as they engaged in the various events of the work place (Cseh, 1998; Lave & Wenger, 1991; Marsick & Watkins, 1990).

During the analysis process the following emergent categories (Table 3) arose as recurring themes in more than one participant's account and frequently across all the participants' narratives. The categories of *father's influence*, *mother's influence*, and *significant*

*other influence*, could be reflected in the *family experience* or *family history* in analyzing the data. However, the general nature of the categories of *family experience* or *family history* did not portray, in fine enough detail, the influence of these categories on the participants. *Sibling influence* emerged in three individual participant's data but was of little significance when compared across all the participants. *Informal educational experience*, *geographical influence*, and *perceived common experience*, were emergent themes that led to significant data recurring in each of the participant's narratives.

Table 3

*Emergent Category and Code Definitions*

Category (Code)	Definition:
Fathers Influence (F)	Father's influence was the explicit and implicit influence of one's father.
Geographic Influence (GEO)	Geographic influence represented the location of one's birth, upbringing, and socialization, as well as the experience gained in travel which influenced the shaping of one's frame of reference.
Identity Development (I)	Identity development was the participant's representation of personal identity as individuals. Though not synonymous with frame of reference, identity was closely associated with the development and utilization of frames of reference as they determine, and were determined by the individuals own perceptions and concept of themselves regarding what defines them as a person.
Mothers Influence (M)	Mother's influence was the explicit and implicit influence of one's mother (Rogoff, 1990).
Peer Influence (PI)	Peer influence represented the influence that shaped one's frame of reference gained through interaction with others in association outside one's nuclear family or significant other.
Perceived Common Experience (PCE)	Perceived common experience represented attributing experience or expected experience of another to be similar or like one's own experience which fostered a sense of common understanding or a common frame of reference.
Significant Other's Influence (SO)	Significant other's influence represented that influence attributed to one's wife, husband, or significant other.

(continued)

Table 3 (continued)

Category (Code)	Definition:
Sibling Influence (SI)	Sibling influence was the attribution of influence by a brother, sister, stepbrother, or stepsister.
Informal Educational Experience (IEE)	Informal educational experience was the experience gained through private study either structured as in private lessons or unstructured though self directed for the purpose of learning.
Personal Experience (PE)	Personal experience was the instances in which there appeared to be an explicit or implicit influence of one's own experience as separate from other influences.
Frame of Reference Utilization (FOR-U)	Frame of reference utilization represented an instance in which one's frame of reference was evident in some form of assumption, belief, or behavior.
Frame of Reference Forming (FOR-F)	Frame of reference forming was an instance in which one's frame of reference was influenced by some encounter, thought, belief, behavior, or situation.

The phases of the Marsick et al. (2006) Informal and Incidental Learning Model formed an additional list of categories (Cseh et al., 1999; Marsick et al., 2006). The data for each of the participants were again aligned with the phases of the Informal and Incident Learning Model listed in Table 4. This alignment facilitated the identification of the participants' engagement with various events and situations of the workplace and brought to light the influence of his or her individual frame of reference on the informal learning process.

Table 4

*Informal and Incidental Learning Categories, Codes, and Definitions*

Category (Code)	Definition:
Triggers (T)	Triggers are an event or situation that set into motion or provide a catalyst for the informal/incidental learning process.

(continued)

Table 4 (continued)

Category (Code)	Definition:
Interpreting the Experience (INT)	Interpreting the experience identifies an effort to make sense of an event or situation as one interprets an experience identified as a trigger to the informal/incidental learning process.
Examine Alternative Solutions (ES)	An evaluation of the potential solutions for a problem.
Learning Strategies (LS)	During this phase, a learner begins to learn necessary skills or use strategies to provide a solution to the problem or come to understand the situation.
Produce Proposed Solutions (IMP)	Having selected a strategy, the individual implements the selected strategy.
Assess Intended and Unintended Consequences (ASS)	Once a strategy is implemented an individual may evaluate the outcome of the intervention assessing the intended and unintended consequences.
Lessons Learned (LL)	As a part of the reflective learning process one considers the outcome of a learning event or situation.
Framing the Context (FC)	A reframing or development of a frame of reference of the environment in which one has been involved is reconstructed incorporating the lessons learned, informally or incidentally, explicitly or implicitly, during the process of resolving the problem or coming to understand the situation.

Synthesis of the findings focused on a textural description of the development of the participants' frames of reference, which was the pre-reflective perceptions of situations and events of their lived experience. Further, a structural description of the meaning attached by the participants was considered to provide an account of the themes that emerged as underlying the experiences. These meaning structures either indexed an influence on frame of reference development, or manifested the utilization of their frames of reference in the informal learning process (Bogden & Biklen, 2003; Gall et al., 2003; Stake, 1995).

Finally, to insure completeness and provide validity each of the ten participants were requested to review, comment on, critique, and correct any findings, discussion, or conclusions in

the participant profiles and findings of this study (Clandinin & Connelly, 2000; Patton, 2002; Stake, 1995).

### **Validity and Reliability**

Traditional forms of validity and reliability often associated with the quantitative paradigm were not appropriate to this instrumental qualitative case study because of its interpretive, naturalistic orientation (Stake, 1995). External and internal validity are appropriate to studies that propose generalizable outcomes. However, the intent of this study was not to generalize, but rather to examine, at a deep level, the emic expressions of the experience of the participants. However, “interpretive validity” (p. 462) was maintained under the conditions of the usefulness of the results to inform and enlighten current understanding of the informal learning process and individual meaning of situations and events which formed frames of reference (Gall et al., 2003; Patton, 2002). Interpretive validity and reliability were maintained through member checking to verify the accuracy of the representation presented by the researcher as corresponding to the meaning structures of the participants, use of multiple resources of data collection, and insuring that the focus of the study was maintained to enhance our understanding of the influence of frames of reference on the informal learning process.

The findings were set in context by a naturalistic approach through thick description of the environment, participants, activities, and events to reflect the emic understandings of the phenomena of frames of reference and the influence of frames of reference on the process of informal learning (Emerson et al. 1995, Gall et al., 2003; Stake, 1995).

The researcher’s position in this study represented an integral part of the study as the interpretive instrument including perception, history, and relationship with the participants and

phenomena. Validity and emic representation were supported thorough member checking. This consisted of soliciting responses, and through collaboration with the participants, to correct and critique representations, insure accuracy, and confirm completeness of the results and findings of the data. This collaboration was continued throughout the investigation, analysis, and reporting process (Bogden & Biklen, 2003; Clandinin & Connelly, 2000; Emerson et al., 1995; Gall et al., 2003; Kvale, 1996; Stake, 1995).

A list of the categories with the respective definitions and explanations for each item was provided to a colleague, along with a representative sample of the transcripts for an inter-rater reliability check to support coding reliability. The coding scheme was supported by the colleague completing a 20% random representation of the transcripts of the participants with nearly a 100% replication of the coding assignment of the researcher. This rater had experience in teaching and learning systems. The participants also corroborated the representations of the individual participant profiles, the various category alignments, and the findings of the study (Stake, 1995; Patton, 1990, 2002). Additionally, the researcher also presented preliminary findings at conferences and further engaged in peer and colleague examination of the findings of this study.

Finally, a thorough audit trail of the research process was established that included participant selection, source of data collection, process of analysis, interpretation, and report development. This audit trail was maintained and reported to establish credibility of the research process (Gall et al., 2003).

## **Limitations**

It was not the intent of this qualitative instrumental case study to provide broad statements or findings that are generalizable to populations beyond this specific study. Rather, the interest of this study was to “particularization” (Stake, 1995, p.8) through fine-grained representation and analysis of the exploration and examination of the intersection of frames of reference and the informal learning process. However, readers and researchers may find in their own research or experience similar representations providing a “natural generalization” (Stake, 1995, p. 85) wherein, one’s personal engagement with life is reflected in the meaning and understanding presented in the study (Bogden & Biklen, 2003; Gall et al., 2003; van Manen, 1990). The small sample size as well as the purposeful sampling approach also prevent this study from being generalized. Additionally, the nature of the field of selection, location, and temporal considerations provide a limited context for this study which further limits the ability to generalize the results of this study.

The familiarity of the researcher with the setting and participants provided both positive and negative aspects which facilitated as well as posed difficulties for this study. On the one hand, the researcher’s position provided access to a suitable research environment, familiarity with the environment as a subject matter expert, and an insider understanding of the symbols, language, and systems utilized in the environment. Conversely, being familiar with the environment presented challenges including the potential omission of understanding through assumptions and a tendency to implicate uncritical understanding of meaning based on the researcher’s own experience instead of coming to understand the meaning of the participants’ frames of reference. However, adopting the aforementioned approaches of member checking,



and peer and colleague examination, to ensure validity and reliability within the context of the qualitative study mitigated the influence of the researcher on data collection, analysis, and reporting (Patton, 2002).

### **Chapter Summary**

This chapter has provided an overview of the research design followed by as description of the research setting. Next, participant selection criteria was set forth. Participant selection was followed by providing a biography of the researcher as an integral part of this study. This chapter then described the approaches to data collection, data collection procedures, and data analysis used in this study, followed by an account of steps taken to assure validity and reliability from a qualitative perspective. Finally, the enumeration of limitations associated with this study was presented.

## **Chapter 4**

### **Participant Profiles**

This chapter presents the profiles of the participants which includes their biographies that illuminate the development of their frames of reference. It also presents selected problems and challenges that the participants encountered to examine the influence of their frames of reference on their informal learning process. Each of these ten participants had been involved in flight instruction for 2 years or less; had been students in the university aviation program; and, had been actively engaged in teaching in the past 6 months. Pseudonyms have been use in place of the actual names of the participants and other individuals to insure anonymity, and the text has been adjusted to obscure the location of the research setting and any other potentially sensitive identities.

#### **Peggy**

Peggy was the only female among three children raised on Long Island near New York City. Her remarks of growing up reflected an active life style that embraced the environment of the city coupled with the quiet pleasures that the New York seacoast provided. During her childhood and until going away to college she participated in many extracurricular activities including softball, volleyball, dance, horseback riding, as well as learning both violin and piano.

Academic life was important to her parents and was accompanied by a restricted home life that limited television and social activities during the week. These restrictions facilitated high academic achievement and special educational opportunities. Two such opportunities in a high school had a significant influence on her; a special school sponsored aerospace camp and attending the National Space Camp at the U. S. Space and Rocket Center in Huntsville, Alabama.

These programs were designed to stimulate an interest and develop young scholars in the field of technology and science, particularly in aviation and space exploration. These opportunities helped stimulate her interest in aviation and space exploration as a career path.

Having performed well in elementary and high school, Peggy continued her education at a reputable state university. Her interest in aviation had also been inspired by her family experience.

We traveled a lot. We used to go away four or five times a year. We'd go on airplane rides, and I would think it was fun. I used to stare out the window, So I think partly that, and another reason is my dad was big into astronomy, for a really long time I wanted to be an astronaut. I decided I wanted to go into aviation so I could get my pilot license then I could go to NASA

She became familiar with the aviation industry and during high school had her first opportunity to fly in a small airplane on a short flight from Long Island to Connecticut. This flight solidified her desire to pursue aviation which factored into selecting a suitable school and college program.

Peggy was interested in a school with high academic standards, an aviation program, and she wanted to live away from home. At that time, she felt a need to become more independent, attending an out of state university allowed increased independence and removed her from some of the stresses and social dynamics of her home life. The importance of her home changed drastically during her second year in the university with the sudden illness and unexpected death of her father.

My brothers and I used to fight and bicker. Same with my mom. I wanted to come to [school] because I wanted to get away from home. [I] had to move out, "I don't want to be here [home] anymore." But now, I, like after my dad died, my brothers and I became so close and I called my mom like every day, [I] still do

Peggy said,

After my dad died I came back and flew some more and it was just, I mean I passed everything but I was just wasn't really all there and I had my final exams a week later and I came back for them. I passed them all. I studied, but I know I could have done better than what I did because my mind was just somewhere else

The difficulty of going home, then of returning to classes and final exams, required support from her family, peers, faculty, and staff at the university. On returning to school, after her father's passing, Peggy expressed the importance of the support that she received during this difficult time.

At the time I lived in my sorority house so I had [friends] always there for me, and my ex-boyfriend was there. He helped me through it, and you know my family called every day. It was tough, and my professors also really understood. I mean I had two weeks before finals week that it happened, and so I had to come back and study for finals and a lot of my professors let me take it later, or let me take as long as I wanted on it...They were really nice. They were all really understanding about it

Her support by others became a defining characteristic in identifying a good teacher. She used terms such as caring, understanding, sensitive, concerned, and responsible to define the characteristics of a good teacher. This experience contributed to her frame of reference development as a teacher, particularly when faced with problems that were similar. Her experience fostered a frame of reference through which she framed expectations of situations and attributed them to others as a *perceived common experience*.

Peggy's frame of reference was further influenced through her mother. She said that others said that she was "just like her mother." Her mother, a Lamaze instructor and OB/GYN with her own business, was patient and open to others. She often demonstrated a genuine concern for the well being of others, and generally was thought well of and loved by those she came in contact with, both professionally and personally. Additionally, she and her mother

participated together in various activities such as horseback riding. Peggy reflected on the importance of her mother's support and care for her after she was injured in a fall while riding. Peggy remarked that how she interacts with others, especially students, reflected these characteristics demonstrated by her mother and those who cared for her at the time of her father's passing.

**Becoming a teacher.** Reflecting on her desire and experience of becoming a teacher she said, "...if I didn't fly I was going to be a math teacher, because I've always wanted to be a teacher..." Shortly after entering the university, Peggy determined that her major in aerospace engineering with a minor in astronomy was not for her. She resettled into a major in math while pursuing her pilot qualifications.

My first instructor was JT, and he was an awesome instructor. [I] had a lot of fun with him. He taught me a lot, and then I had him again for [beginning instrument training] or [advanced instrument training]. That was kind of cool. Um...I've lucked out with flight instructors. It was my first semester flying, he was very friendly

These characteristics set her first instructor apart and framed her conception of what it means to be a flight instructor. She aspired to be "professional yet friendly...to make learning fun," and to take a personal interest in her students. These had been tenants of her first flight instructor as well as some of her other teachers. These characteristics became part of her own practice of teaching and interaction with her students. She said, "...I feel like the way the flight instructor and the student relationship is, its a little bit more intimate than it would be if you were in a classroom or something like that..."

Her first flight instructor enhanced her learning by his approach and the relationship that he developed with his students.

He was professional but at the same time he would say that we were friends, which made it a lot easier for me to learn. I guess maybe that [be]cause I thought that like doing stuff and when we were in the airplane it wasn't just about aviation we'd talk about, "how's your day going?" And he'd just joke around and I think it made the learning fun so that it wasn't, it didn't seem like work

She contrasted this experience with a negative learning experience later in her training.

All my instructors I felt were really good but for one. I had a bad relationship with [him] and I cried half the semester. He would just sit there and yell instead of teaching. Well he would teach, but he would yell at the same time. I don't respond very well to yelling and screaming and it throws me off, and I don't want to do any thing

Her frequent reference to this episode illustrated how indelibly etched in her mind the situation was and how it factored into her framing a teacher's identity. She survived the experience through the positive reinforcement of others and by the recognition that this instructor's comments were not consistent with those of the other instructors. She related a similar experience that helped her to frame her feelings about the situation.

My violin teacher was ...very, very strict and very sort of anal about everything and she would scream all the time and...So I kinda had that, and so when I had, you know that flight instructor that screamed all the time, it was kinda like been here done this before. But it still, still sucks. So like my violin teacher did the same thing

In this case she continued with violin for a number of years becoming accomplished such that she was recognized at a state level. Nevertheless, this approach to teaching led to her cease studying violin. Similarly, with the abusive flight instructor, she often felt like giving up and felt that his methods impeded her learning. This experience framed her ideas of teaching,

Her experiences as a student shaped her beliefs about effective teaching, values, and the qualities she would desire to emulate as a teacher. This frame of reference included interacting with her students, developing a relationship that facilitated their learning, and factored into

making decisions in the workplace. For Peggy, a “good teacher” was defined by both the positive and negative experiences that shaped her frame of reference of teaching and the learning environment.

During her early experience as a flight instructor she styled her approach as professional yet friendly as a part of her identity as an instructor. However, as she attempted to be friendly with some of her students she learned that it could be difficult to maintain a professional conversation.

Well, as far as anyone I teach. My students are all about the same age as I am. So that it is hard for me to start talking, “what did you do last night? Oh I went to the bar and.” So you have to kind of separate your personal life from your work life so when I talk to them I try to pick things like “did you study last night?”

Her ideas of the appropriate relationship resulted in a transformation of her approach to developing these instructional relationships. She said,

I remember my first semester my students would talk about how they went out last night and got drunk over the weekend and I try to stay away from it because I didn’t want to, I don’t know; I just didn’t think it professional to sit there and talk with your student about stuff like partying. So I try to stay away from that conversation. [I] try to direct it to something else...more on the professional side.

She said,

It just seems awkward because I am supposed [to be] someone that they...kind of a role model. If I am sitting there talking about drinking, partying. Yeah, they are in college and I, still if I had an instructor and all he talked about was stuff I don’t think I would feel very comfortable. It would just be weird. It’s like a regular teacher only you are in closer quarters

The entirety of her educational experience, both formal and informal, fostered beliefs and values of the teacher’s role in the student-instructor relationship. These beliefs formed a frame of reference from which she engaged with the work environment and the situations that were met

within that environment. She learned from the situations as she adjusted her approach while retaining sensitivity to the needs and challenges of her students.

Maintaining an open line of communication was important to her as a teacher. Acting in a caring manner, and being sensitive to the needs of the student, while maintaining a professional relationship took on new meaning for Peggy. Her endeavor to define and develop herself as a teacher was a continual informal learning process, framing and reframing of the parameters which such a relationship entailed. She was friendly, yet now with more restraint, she was sensitive, yet because of problems that she had encountered as a teacher she had learned to confront poor performance and inappropriate attitudes.

To Peggy a good teacher was,

one who instructs and guides the student in what they are doing. I guess I can't pick up on everything but, like for instance in dance they would pick up on is how you point your toe, if you were a little off they would pick up those little things that you're not thinking about as a student you know. Maybe my ankle is facing the wrong way and I need to turn my heel a little more, I'm not thinking about that and like in flying, we know how to do it, but it's the little techniques that help them to do it a little bit better

As she reflected on her previous experiences as a learner, like when in dance, horseback riding, or mastering an instrument, her teachers corrected the little things and provided individual strategies that facilitated her learning. In reference to her own teaching she said, "...I remember the very first [student] solo [flight]. I was nervous, but he just went in the pattern, and I was staring outside the whole time. I don't know, I still get nervous on solo flights..."

Expressing a sense of responsibility for the development of the critical skills of her student and her feelings after the successful completion of the final practical test of one of her students she said,



I felt relieved first of all because I was really nervous and he passed. I felt like a proud momma...it's my student. I kind of taught him what to do, he had never flown before and it was all me, and everything looked good

In this successful effort she found satisfaction while she expressed frustration with the disconcerting apathetic attitude of another student. Each event had its own meaning based on her interpretation filtered through her developing system of values and beliefs. These events were interpreted according to her frames of reference of teaching and learning as a part of her daily experience. She remarked, "...pretty much I feel like ...that every semester I feel like I'm picking up something...whether from past experience [or] and my students..."

Her frame of reference about being a teacher was the result of a developmental process through experiences which provided the backdrop to her beliefs and values shaping who she was as a teacher. Her development was a dynamic interplay with her environment, students, peers, and lived experience, both at work, and elsewhere, as an interwoven facet of her sociocultural milieu. Her frame of reference provided expectations for the learning environment, and influenced her interpretation and response to events and situations of her daily experience.

**Informal learning and problem profile.** Problems in the workplace acted as triggers for informal learning for Peggy. These problems faced by Peggy and the other participants can be described by two broad categories. The first was a *Technical Skill or Knowledge Problem* while the second was a *Social Interaction Problem*. A technical skill or knowledge problem was a problem that a student had with an operational task of flight in the psycho-motor domain or a difficulty in understanding one of the many cognitive requirements of the discipline. The social interaction problem was the product of a variance in an affective domain, involving the feelings, beliefs, values, and/or goals. Social interaction problems included adverse student attitudes, and

inadequate motivation perceived to be in conflict with those of the teacher. These were often the underlying issues which led to poor student performance or were manifest as a conflict between the student and the teacher.

Tracing Peggy's informal learning when attempting to resolve her students' learning problems illuminated the influence of her frame of reference on the informal learning process. Table 5 is arranged in concert with the Marsick et al. (2006) Informal and Incidental Learning Model listed in the left column. The center column associates an event with an evident frame of reference listed in the third column. Iterations of the process are identified by subtopic small case letters.

Peggy had one student that continuously applied inappropriate control inputs during one particular maneuver (Table 5.1 & 5.2). She utilized a usual approach to resolving this technical skill problem (Table 5.5) but without satisfactory results. Then, in an innovative move she had the student sit on his hands, while doing the maneuver to demonstrate the appropriate control inputs, thus resolving the problem (Table 5.5). In this particular situation, having exhausted the routine approaches, Peggy applied an innovative approach illustrating her informal learning through this episode (Table 5.3 & 5.4). The positive reinforcement, through a positive outcome, helped her frame flexibility in teaching as a valuable characteristic (Table 5.8).

Table 5

*Technical Skill or Knowledge Problem, Peggy*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Inappropriate control input	Based on the instructor's knowledge of the accepted stall recovery techniques (FEE).

(continued)

Table 5 (continued)

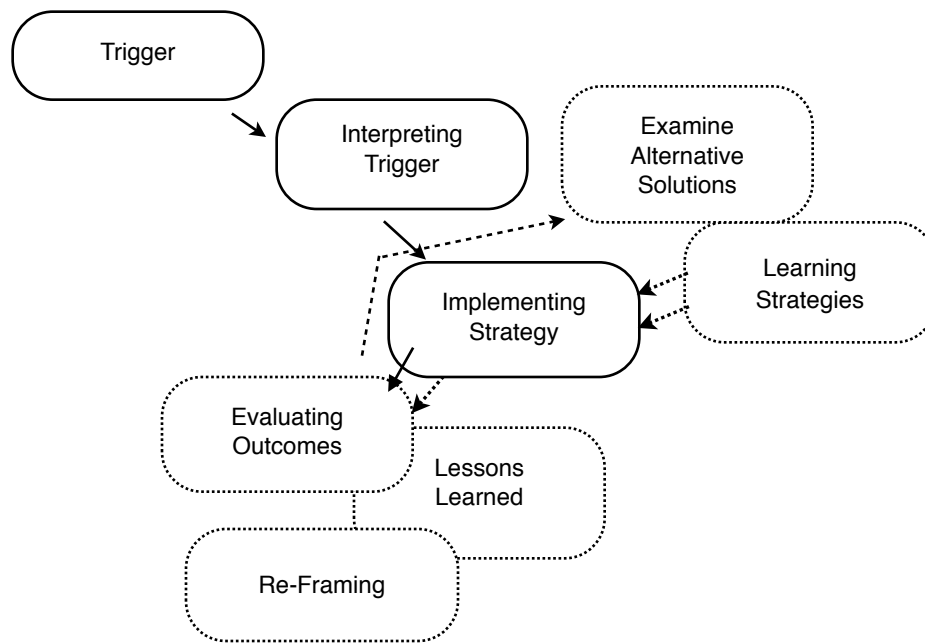
Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
2. Interpreting the Experience	Observed the inappropriate control use during stall recovery	This interpretation was based on the higher level of knowledge of aerodynamic and accepted recovery procedure as well as developed skill of the instructor (FEE, FOR-U).
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy.	<ul style="list-style-type: none"> <li>a. This phase was by-passed on the initial engagement of the informal learning process.</li> <li>b. Having utilized the usual correction of verbal direction without success in a subsequent iteration of the problem solving and informal learning process, Peggy elected an innovative approach of having the student sit on his hands during the maneuver.</li> </ul>	<ul style="list-style-type: none"> <li>a. Responded with her usual or routine approach (PCE, FEE).</li> <li>b. Peggy chose from the normal set of resolution tools but without success fostering the need to learn a new method of correction (BVR, WE, FOR-U).</li> </ul>
4. Learning Strategies	<ul style="list-style-type: none"> <li>a. This phase is by-passed initially.</li> <li>b. However, when these methods proved to be inadequate Peggy experimented and learned to transfer a strategy from another process.</li> </ul>	<ul style="list-style-type: none"> <li>a. Learning of the usual approaches was a by-product of her own learning as a student (FEE).</li> <li>b. Peggy adopted a trial and error approach as she crafted an intuitive transfer as she assigned an expected common outcome based on her experience teaching taxing to resolve inappropriate control inputs (FEE, WE).</li> </ul>
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Peggy had originally utilized verbal correction but with little success.</li> <li>b. With additional iterations she derived an innovative approach.</li> </ul>	<ul style="list-style-type: none"> <li>a. Peggy implemented her usual approach on the initial response to the trigger (FEE, PCE).</li> <li>b. She transferred a method from another procedure to address the problem as a function of the beliefs as a teacher coupled with her work experience (BVR, WE).</li> </ul>
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<ul style="list-style-type: none"> <li>a. Original outcomes were unsatisfactory.</li> <li>b. The failed usual approach instigated a return to examination, learning and implementation of an alternative strategy which fostered a successful outcome.</li> </ul>	<ul style="list-style-type: none"> <li>a. The unsuccessful outcome was evident in the instant feedback of continued poor performance (FEE).</li> <li>b. The successful outcome was evident in the improved performance of the student (FEE, WE, FOR-F). The lack of explicit expression of assessment for herself may indicate tacit level evaluation.</li> </ul>

(continued)

Table 5 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
7. Lessons Learned	a. Not explicitly articulated. b. Peggy indicated that she learned the importance of developing varied approaches to meet the needs of her students.	a. Appears to have responded at the intuitive level (FE, FOR-U). b. Indicates that learning to be flexible in a key aspect of being a good teacher (BVR, FOR-F).
8. Framing the Context or Reframing	Not explicitly articulated by the participant.	Positive reinforcement to her ideas and beliefs of being an innovative and flexible as a teacher (BVR, FOR-F).

This process of informal learning may be mapped as depicted in Figure 8. As the trigger was encountered, she initially interpreted the trigger and then responded with her usual approach as indicated by the solid arrows. The unsuccessful outcome drew Peggy into the process of evaluating alternative solutions and learning new teaching strategies by trial and error as indicated by the segmented lines. Having implemented the new teaching strategy with a successful outcome, though not explicitly articulated, she learned through the evaluation thus reframing her understanding of teaching. The segmented boxes are indicative of the tacit and overlapping nature of these phases.



*Figure 8. Informal Learning Process Map, Peggy-1.*

In another account of a social interaction problem she related,

Last week I had a student that, he came in one day and started to talk. I'm like, "how's your day going?" And he's like, "ugh," and I am kind'a curious as to why. Then he started talking about how he and his girlfriend had gotten into a fight the night before he had no sleep, and he was tired and angry and we decided that we were going to just discuss that day

The downcast and distant affect of this usually upbeat student prompted her inquiry and an informal learning episode (Table 6). In this situation she elected to alter the scheduled flight period (Table 6.5). This was an unusual decision due to pressure to complete the flight program within the semester boundaries as well as being a stated job responsibility of a flight instructor. This usually meant that if one could fly, then one should fly, in order to meet these requirements. The unpredictability of factors such as aircraft availability and adverse weather meant that lost time in training was costly and makeup time was scarce.

This level of interest in her student illuminated her frame of reference of teachers as professional, friendly, and caring. Her observation of this change in his behavior was facilitated

by her past social experience and development (Table 6.2). Changing her planned activity though there is no physical reason the student could not fly she said was prompted by remembering what it was like when her father had passed away and she had to return to school and flight periods. The upsetting personal experience led her to anticipate that the student performance would be hindered as hers had been at that time and she wanted to provide the best learning situation for her student (Table 6.2 & 6.5).

Table 6

*Social Interaction Problem, Peggy*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Changed behavior of the student	
2. Interpreting the Experience	a. Recognized and questioned the student, determined that the student was emotionally upset.	a. Recognition could occur because she had developed a close but professional relationship with the student and had experienced emotionally upsetting events in her own experience (FE, SOC, FOR-U)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy.	a. Not explicitly articulated, However, she could have continued with the period as planned but chose another course of action.	a. Peggy chose not to fly based on her belief that the flight would be non-productive as her own performance had been during a period after the untimely death of her father (FE, PCE, FOR-U).
4. Learning Strategies	a. Not explicitly articulated. However, personal learning from past experience provided an approach to the situation.	a. This was an intuitive transfer founded on the tacit learning of her past experience as Peggy assigned an expected outcome based on her experience (FE, PCE, SOC, FOR-U).
5. Produce Proposed Solutions or Implementation	a. Change in plan of action from flight to discussion.	a. Having had the experience of her father's passing and the outcome of her own performance during that time she chose a strategy to suit the need of the student (FEE, BVR, FE, FOR-U).

(continued)

Table 6 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	a. Not explicitly articulated.	a. May have been tacitly performed and not articulated (SOC).
7. Lessons Learned	a. Successful resolution	a. Considering the needs of the student may result in positive outcomes (SOC, BVR).
8. Framing the Context or Reframing	a. Not explicitly articulated.	a. Positive reinforcement to her ideas and beliefs of being a caring involved teacher (WE, FOR-F).

Her informal learning during this situation followed a more linear path as depicted in Figure 9. Peggy appeared to have bypassed phases three, examine alternative solutions, and four, learning strategies, of the informal learning model (Table 6). With the positive outcome of the situation, she verified that a caring approach was a suitable means of addressing such problems.

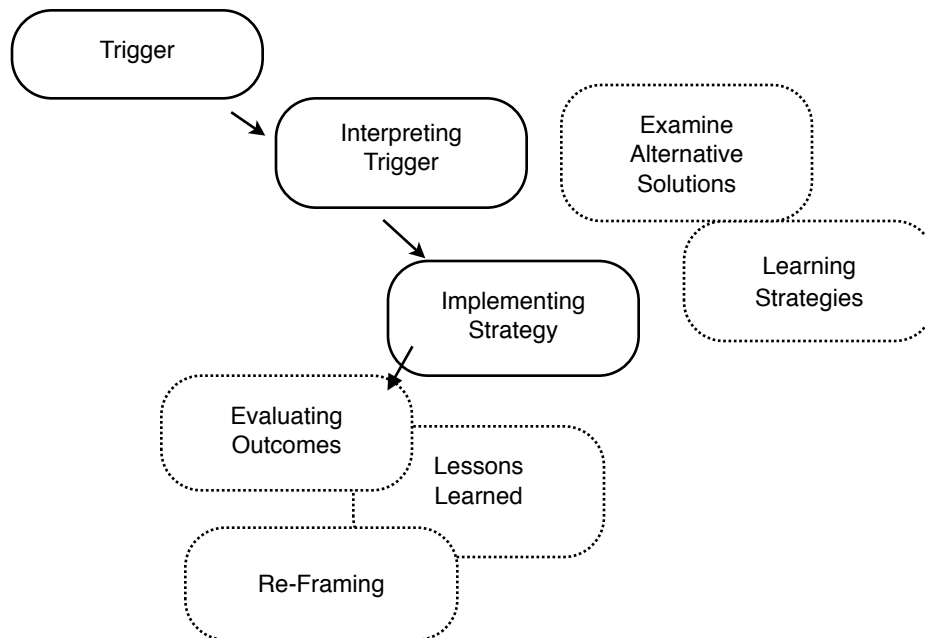


Figure 9. Informal Learning Process Map, Peggy-2.

This situation had more clarity than many of the social interaction problems that the participants encountered (Table 6). This situation lent itself to rather clear strategies to accommodate the needs of the student based on her intuitive response (Table 6.5). The outcome was a stronger relationship with the student and reinforcement of her frame of reference as a teacher; supporting, concerned and accommodating her students (Table 6.8).

In contrast another situation illustrated how social interaction problems differ not only student to student but in the type of situation and intensity of the events (Table 7). Peggy related that the root of the difficulty was identified as a social interaction problem only after several iterations of the informal learning process (Table 7). At first, this problem appeared to be a technical skill problem in which the student had difficulty in such tasks as holding a heading or maintaining altitude (Table 7.1). Illustrating her guidelines for the students (Table 7.5) she remarked.

You know I have rules. First, we are going to start the maneuvers, then the procedures for the maneuvers, then they actually have to tell them to me before they can fly them. Obviously, if you do not know what is going on you are not going to be able to [do them]. So, every day I tell them go home do some studying, review the maneuvers, come back so you know what is going on

After some time of attempting to remedy the skill problems she came to believe another approach might be necessary (Table 7.6). To evaluate the student's proficiency, while assessing her own methods and judgment of the student's skill, she arranged to exchange students with another flight instructor for a training flight (Table 7.5).

Charles had a troubled student as well that was not doing as well as his other student. So he wanted to have someone else fly with him so that he could get a different perspective. Maybe he wasn't telling him something he was missing or something. So we switched students so that we could help each other out with students, but we also wanted to keep ourselves you know, if we were accurate in our understanding of how the student was progressing



They had heard of other instructors employing this novel approach, though neither had participated in such an approach. This seemed to provide a way to gain some understanding of the students' needs and possibly provide ideas or approaches to address the situation (Table 7.3 & 7.4). This exchange confirmed Peggy's beliefs about the student's lack of competence and fostered confidence in her evaluation of the student's performance (Table 7.7).

This was only part of a long history of strategies employed to address the lack of technical skill and knowledge that plagued the student. On more than one occasion, she noted a lackadaisical attitude marked by an obvious lack of preparation for the assigned task. She said,

She couldn't tell me the different steps to [a maneuver]. She would sit there, "umm, I don't remember could you tell me that again?" So finally, it was like the fourth maneuver, she couldn't tell me anything and I just said, "okay, the flight is over were going back."

Reflectively, Peggy termed the nature of this problem as a lack "commitment" and "motivation" on the part of the student (Table 7.2, 7.7, & 7.8). This lack of commitment to the flight program she determined based upon the student's failure to apply herself to the curriculum to become successful.

During the process Peggy made repeated attempts to address the technical skill and later the motivational problems but without success (Table 7.5). Illustrating this process she related a conversation with her student.

Right now I am not really concerned with how you perform the maneuver just so you know the steps, and the rest will follow. And then, she came in we had reached the [practice] area. Then I said, okay lets see a steep turn, and she blows off clearing turns, GUMP [Gas. Undercarriage, Mixture, Prop] check, and...Then I have them establish and altitude also. So she completely blew off those, and then, okay alright she kind of got it. Second one [maneuver] slow flight or power off stall or whatever it was she couldn't tell me the different steps to it she would sit there

She had provided homework assignments that were not completed, supplied cognitive tools and strategies, but the performance of the student failed to improve (Table 7.6 & 7.7).

After repeated failed attempts to correct the problem she re-interpreted the core problem to be a lack of commitment, indexed by the student's failure to study (Table 7.8).

On an occasion Peggy terminated a flight period early because of poor performance, she remarked,

[the student] said, why? And I said, obviously you did not study, or you did but you didn't retain information. If we continue this flight it will be a waste of your time and my time. There is no sense in practicing...[if] you can't remember the steps. [if you] don't know what's going on." She kind of got upset and started crying and I felt bad

Peggy's experience with the abusive instructor had framed strong action as being "mean" and inappropriate for the learning environment. During this episode, she remarked, "I was just really frustrated." The lack of skill development and application to the assignments required Peggy to assume an approach in which she had to informally learn to balance her efforts to support the student, while she learned to confront inadequate preparation (Table 7.3, 7.4, & 7.7). Peggy had been a well prepared student and to be unprepared was foreign to her frame of reference of the student's role in a learning environment (Table 7.2).

I think that it was mostly frustrating that I felt that I was more into teaching than she was into learning...and that she wasn't committed and that she was not taking it serious enough. That she wanted to go home and [didn't] study [to] be prepared for the next day. I mean I felt like she wasn't in it because she didn't want to do it

She reinterpreted that the student "was not trying," and that she "was not committed" to the aviation program (Table 7.8). This social interaction problem was more subtle and embedded in the technical skill problems of the student. This made it hard to detect, interpret, and address, because it was ill-structured and resistant to development of well defined solutions.

After several attempts to resolve the problem, she recommended the student for remedial training (Table 7.5). This meant that the student's training would continue into the next semester with a different instructor which set the student on a trajectory that meant more expense, more time to pilot certification, and a delay in the completion of the student's degree plan.

Table 7

*Social Interaction Problem, Peggy*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Poor student performance in the aircraft, altitude and heading control.	Based on her aviation experience and established criteria (FEE).
2. Interpreting the Experience	<p>a. - c. Interpreted as a technical skill problem. The student had trouble maintaining altitude or flying a heading coupled with a problem in remembering associated procedures.</p> <p>d. Re-interpretation as a social interaction problem identified reflectively as student commitment.</p>	<p>a. - c. Based on her assumption of student intent to learn as she had as a student intentionality in learning (BVR, FEE, PCE, FOR-U).</p> <p>d. Interpretation remained unchanged until she identified the core issue of the student's commitment to the domain (SOC, FOR-U).</p>
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy.	<p>a. This phase was by-passed on the initial engagement of the informal learning process.</p> <p>b. - c. Several iterations in which Peggy returns to select another strategy after the previous attempt has been unsuccessful. Used collaboration, home study, and trial and error.</p> <p>d. Not explicitly articulated.</p>	<p>a. Utilized a routine approach initially (FEE).</p> <p>b. Peggy had a number of strategies that she employed of which she chose a sequence in an attempt to resolve the problems (FEE, FOR-U).</p> <p>c. Collaborative development of an exchange of students (FEE, SOC).</p>

(continued)

Table 7 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
4. Learning Strategies	<ul style="list-style-type: none"> <li>a. Learned routine strategies from her own experience as a student.</li> <li>b. Often the strategy was one that had been used by her instructor during her learning as a student. She also created approaches to address the problems as the standard approach failed.</li> <li>c. One innovation was an exchange of students through collaboration with a colleague experiencing a similar challenge. This incorporated an element of interpreting the problem as well as implementing a strategy.</li> <li>d. Not explicitly articulated.</li> </ul>	<ul style="list-style-type: none"> <li>a. Strategies may be established in routine situations requiring only implementation (FEE).</li> <li>b. Learned various approaches through experimentation and trial and error.</li> <li>c. In collaboration or reviewing literature, learning became a part of the examination and selection of alternative solutions (BVR, WE, FOR-U).</li> <li>d. Appeared to be an intuitive response transferred from her experience (SCN, SOC, FOR-U).</li> </ul>
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Initially implemented a routine strategy.</li> <li>b. Implemented as series of corrective strategies returning to select alternative approaches as prior approaches failed to mediate the trigger.</li> <li>c. Used collaboration and innovative approaches.</li> <li>d. Implemented corrective action to encourage increased focus increasing with intensity with each iteration.</li> <li>e. Employed direct confrontation and finally recommended remedial training.</li> </ul>	<ul style="list-style-type: none"> <li>a. Initial implementation followed a usual approach (FEE, PCE).</li> <li>b. - c. In an endeavor to mediate the problems of the student Peggy continued in the learning process through various approaches (FEE, SOC, FOR-U).</li> <li>c. Attempted a variety of strategies in accordance with being "committed to teaching" (BVR, FOR-U).</li> <li>d. - e. The implementation of various strategies to combat the lack of application of the student to the curriculum (SOC, FOR-U).</li> </ul>

(continued)

Table 7 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<p>a. Not explicitly articulated however, with the failed approach she returned to examine alternative strategies.</p> <p>b. - c. With every attempt to resolve a problem Peggy made an assessment of the outcome. In these repeated failed attempts she returned from this phase to selecting alternative strategies.</p> <p>d. Finally, assessment overlapped with re-interpretation of the underlying problem.</p>	<p>a. Failed approach required additional search for strategies.</p> <p>b. - c. With each attempt, the outcome is assessed in line with the unsatisfactory performance of the student (FEE, WE, FOR-U).</p> <p>c. After several attempts to resolve the technical problems Peggy determined that there is a deeper problem (WE, BVR, SCN).</p> <p>d. Her social interaction experience awakened the realization that her student was not demonstrating an appropriate commitment level (SOC, SCN, FOR-U). This was perhaps resisted by her frame of reference at first (BVR), founded on the expectation that during this semester she was an inexperienced instructor (I, FOR-U).</p>
7. Lessons Learned	<p>a. Initial strategies were unsuccessful</p> <p>b. - c. Learned through collaboration and experimentation. Moved to Interpretation.</p> <p>d. Recognized the lack of commitment of the student and learned that a social interaction problem impeded the progress of resolving the evident technical skill problem. Moved to Re-framing.</p>	<p>a. - c. With each failed strategy Peggy learned implicitly (FEE, WE, FOR-F).</p> <p>d. Founded on social experience coupled with the requirements of the learning environment in accordance of her beliefs of an appropriate learning environment and the relationship of the student and teacher (BVR, SOC, WE, FOR-U).</p>
8. Framing the Context or Reframing	<p>a. - c. With each failed attempt there was an adjustment made by Peggy trying to gain an understanding of the problem. Each resulted in a subtle change in her frame of reference of the problem and led to a change of teaching in general.</p> <p>d. - e. Adjustments to her frame of reference of the learning environment and to altered meanings of ideas such as professional, close, friendly, and student responsibility.</p>	<p>d. - e. Not all students are committed. There are limits to what she as an instructor is able to accomplish without the student investing in the learning process (BVR, WE, FOR-F).</p>

Peggy's efforts were unrewarded as the student violated an implicit contract between the teacher and the student according to Peggy's frame of reference. This resulted in a cessation of interaction, decline in performance, and lingering emotional burden. The emotional disquiet that this situation created for Peggy was evident throughout the interview. Additionally, she indicated as a result of this experience she would be more firm in the future illuminating a transformation of her frame of reference (Table 7.8).

Peggy's informal learning during this social interaction problems, as depicted in Figure 10, was more complex than in the previous social interaction problem. Peggy initially addressed the situation with a routine approach represented by the solid boxes and arrows. With each failed attempt she returned to phases three and four to determine and often simultaneously learn another approach to implement, as depicted in segmented arrows. With each iteration, she implicitly assessed and learned about the process of teaching as depicted in segmented boxes. After several failed attempts she reinterpreted the core problem to be a social interaction problem. She continued to learn and implement strategies to attempt to resolve this issue as depicted by segmented lines. It appeared that often the phases overlapped as depicted by the overlapping boxes and the absence of connecting arrows.

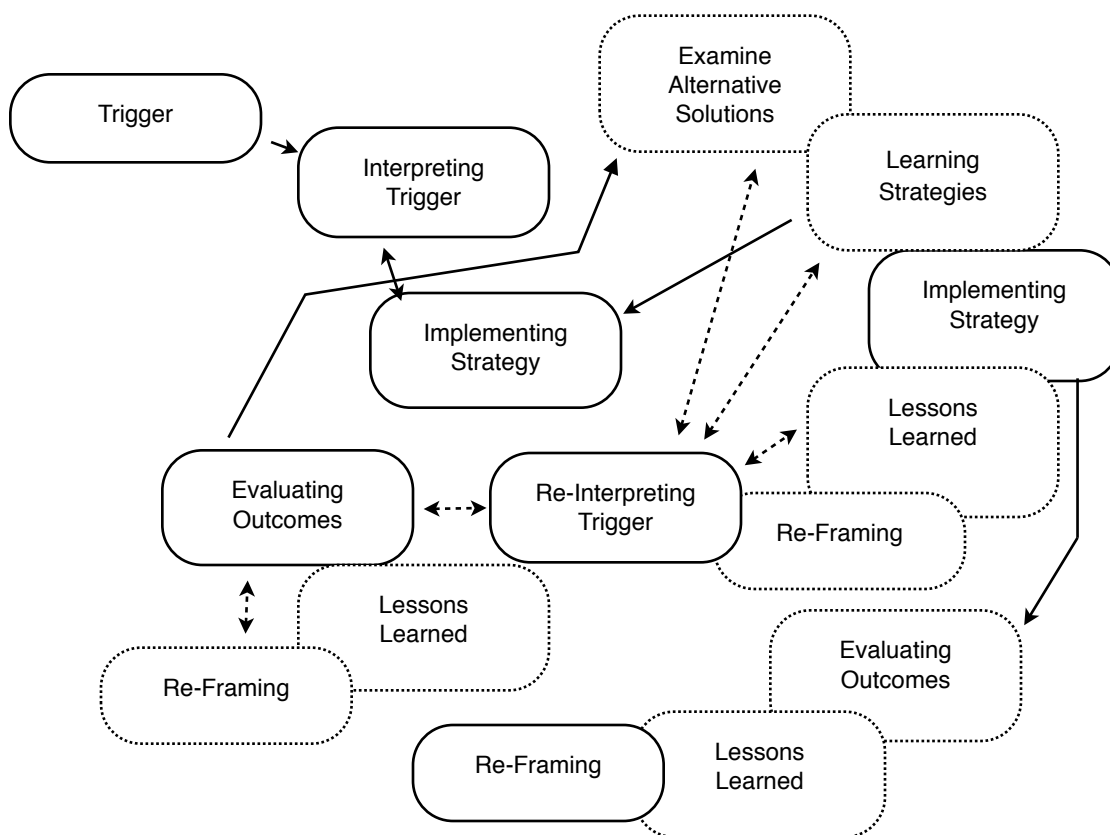


Figure 10. Informal Learning Process Map, Peggy-3.

Peggy spoke of other problems that she encountered in the early part of her teaching experience. Responding to technical skill or knowledge problems she often resorted to approaches founded on her experience as a student as she worked toward mastery of a maneuver or procedure. On occasion she developed an innovative approach, collaborated with peers and co-workers, and learned through trial and error.

The various situations faced by Peggy challenged her frame of reference of teaching, strategies, methods, and relationships. Through these she provided examples of her informal learning to adapt her teaching to the various needs of her students. At the same time Peggy displayed her frame of reference of what it meant to be a teacher as she adjusted to the needs of each student, both with severity and understanding, and attending to what she framed her

responsibilities to be in the educational workplace environment. Understanding how she had learned best as a student, she often implemented these strategies for her students, endeavoring to assist them in developing the appropriate skill set. When these approaches fell short she engaged in informal learning episodes, adjusting her beliefs about being a teacher learning in an effort to facilitate her students' learning.

### **Sam**

As a new flight instructor Sam's first student came as a novel experience for him. His expectations of an aviation student were based on a background of aviation as a central focus of his family history and culture. He said,

I mean obviously a new instructor comes in, and you know, you're kind of doing things by the book because its suppose to happen with a student and its going to be this way. And, well I mean, my first student was a shock. A guy who's coming for remedial private pilot and only wanted a private pilot's license. He was an actuary science major, and you know very analytical guy. The guy was, actuary science is all about math

Sam's first student was not an aviation major but an advanced undergraduate student in another discipline. He was an international student with a native language other than English and due to his near graduation he was involved in various activities in the interest of his post college career. In contrast, Sam had been an aviation major who was centrally focused on a career in aviation. Focus, career path, interest in aviation, background, culture, and language variation were in conflict with Sam's implicit expectations and perceptions of norms for the university aviation program.

His student was not interested in developing a career in aviation, rather his aspirations only extended as far as a Private Pilot Certificate. This was the lowest level of certification offered in the university program set in relief against Sam's aviation career aspirations. Sam's



desire for an aviation career had led him to the university for a reputable focused program in aviation. This, coupled with his interaction with other students in the program, much like himself, was challenged by the variation of his first student.

Sam had entered the aviation program some time earlier already in possession of his Private Pilot Certificate along with a rich family history in aviation.

I took my first flight with ah...with my dad. I've always wanted to [fly], like my first word was airplane...umm. So I went flying in a 152 [Cessna 152] and soloed in that, on my 16th birth day. Then I was like, "I've gotta keep on going cause I love this, so I'm going for everything. I'm going to be a pilot."

He had successfully completed the course work and had become an instructor in the university aviation program. His aspiration, goals, motivation, and priorities were focused on aviation, and on an aviation career.

A Private Pilot Certificate is the first available FAA certification that allows one to carry passengers aboard an aircraft. Sam had positioned himself to complete the requirements for his Private Pilot Certificate at the earliest legal age of 17. The impact of the terrorist activity of September 11, 2001, postponed this opportunity as the aviation industry was devastated by the event. During this time, flight of any kind ceased for three days. Flight schools closed across the country, and training was curtailed. These events and obstacles did not assuage his desire to fly but only delayed the fulfillment of his dreams. This intent to fly and pursue a career in aviation dominated his decisions about his activities and priorities.

The oldest of two children, Sam's life had been engaged in the aviation community from his earliest memories. His father had attended this same university and taught as a flight instructor there moving on to a career in aviation. Sam expected to follow the same course as his father who had become an airliner captain. With his parents both actively involved in the

aviation industry, his family rode the waves of the ups and downs of aviation as a part of their family history. Sam's mother had been a flight attendant and then for the past several years she had been a ramp agent. He said,

Aviation has been my family's life...you know, my dad always had [gave us] airplanes toys and like that. And he'd take me on his trips...and I'd wear a little leather jacket and a little suit case. I'd sit in the back seat, and it was just a blast to be in an airplane

Sam noted that an aviation life style provided certain advantages that were impressive to him.

I remember one instance...we sat down at the kitchen table, my sister, and I...she is 4 years younger than I am. They spread out a map of the United States and everything. They asked, "where we would like to go?" We said, "Hawaii," [they said], "okay." And so we jumped on Delta to Dallas and then went to Hawaii.

Sam indicated that his father's experience, example, and interest in an aviation career was a very positive factor in his development. He said, "...my dad loves to travel also and he says 'I love my job.' That's to me is me in a nutshell, travel one, two I've got to be doing something..."

Through his father and mother Sam had come to value the field of aviation and it's potential advantages for himself and his family.

I've always wanted that for my family too...and I can see that this kind of a life style...you know, you're gone at times and other times you're home for three or four days...ah...it's important that planning things as opposed just a nine to five schedule. "I'm gone all day so you got the morning, and the afternoon, and we've got this weekend here." I kind of like that, it's a bit of an unknown which can be taxing at times and then I still believe if you like what you do you don't really work another day in your life. I mean you obviously have times that it's like a pain in the butt but, I think in general...from what I've grown up with, from what I've always known. So with that being said, I know that it's going to make me happy...through the tough times and things like that...I still love my job, I'm not like I've gotta go to work you know.

He saw aviation as rewarding in providing unique experiences as a part of his daily life. He depicted the career path he had chosen as an ideal path fostering implicit expectations that others involved in the university aviation program would also share this passion and motivation for an aviation career. Despite the difficulties of the industry such as furloughs, financial constraints, required relocations, and layoffs which he witnessed, Sam considered aviation a rewarding career and approached his early instructor experience from this frame of reference.

**Becoming a teacher.** For Sam it was a natural progression to instructor certification because of the need to build pilot in command time inexpensively, and to follow his father's pattern at the university. He felt that he had something to "give back" to the industry as an instructor and instructing would enable him to gain the required pilot experience to move on to the next level in the industry.

During this early teaching experience Sam found that each of his students had special needs and requirements for learning and skill development which required flexibility. He also found that his student's personal pursuits impeded progress in the aviation curriculum. Sometimes these problems deviated from the preconceived notions Sam had of what was to be expected and had to be factored into how he approached his responsibilities.

His earliest approaches to teaching were fostered through his formal CFI training experience. Through a variety of problems, Sam learned to utilize various approaches in a departure from the naive forms of his early inexperienced teaching. His informal learning experiences resulted in reshaping his frame of reference of teaching.

Sam's engagement in the workplace and strategies utilized with the various students could be traced to origins outside of the formal training he had received. Learning, as he worked

through the various problems to seek innovative approaches and solutions, became a part of his response to the challenges, reframing his concepts of teaching and interaction.

I just felt that Don Bales [CFI] class was very you know, talk about this and talk about that you know and this is how your present this maneuver and it didn't seem very relaxed and well...there's so many things in life more than just instruction you just have to, you know...jump off the beaten path and find your own way.

Faced with the challenge of facilitating his own student's learning, he resorted to strategies that were effective for him as a student in aviation.

I spent a lot of time with the students doing you know, I give them handouts; I give them stuff to look at. I give them to stuff to supplement what I said... because I'll be honest. There are so many times at the commercial level I'm sitting, I'm listening to Jane Pearson start talking about a Chandelle or a Lazy Eight just for an intro in [Commercial Pilot] and I go, "yeah this kinda makes sense," and that's the end of what I'd hear. Whereas if I was told this is a great thing to read.

Some of these methods he had adapted to meet his personal learning needs and style. The methods, tools, and approaches that he used as a student to understand the curriculum became a part of his routine tools for trying to facilitate his students' learning. Some approaches he had modified and implemented, while he found that some situations required strategies that were translated from other domains to meet a student need. He also realized a need to be open.

I mean 'cus Pasha would ask questions that would just blow me away. There's a couple of guys come in and we're all just sitting there just stumped like, "I don't know how that works at all." You know, and I didn't think that you'd get to that point. But, I would ask some team leaders and I'd ask, and they were like I don't know; it would be a question for the aircraft manufacturer I guess I don't know. A couple of times I had to just say, "you know that a great question, but we might search for another way to find it, but nobody here seems to know."

Sam said that he was able to utilize abilities he had developed through social interaction experience. His adaptability and openness to new experiences and ways of thinking served him

in learning, adjusting, and addressing appropriately, the variation of his students, and the responsibilities of the workplace. He remarked, "...I was that kind of guy in high school too... you have to just compromise... I know how to talk to different people, and certain situations, and depending on the surrounding or the environment..." Sam had worked as a dispatcher for a fixed base operator, a bartender, and as a waiter. He believed that skills he acquired in these work settings were a resource for addressing the needs of his students. He remarked, "...I think a lot of that again is going back to past experience, of being part 61 [Title 14, Code of Federal Regulation, Section 61(14 CFR § 61)] and having an aviation family. My dad never lets me forget that he never stopped learning in this industry..."

With each experience he reaped new learning, rendered new approaches, and reshaped his frame of reference. This subtle change appeared to occur, implicitly if not explicitly, reframing his expectations for future teaching engagements and influencing his response to those situation and events. He said, "...I saw a lot of how some of the guys dealt with it, setting the stage, providing context...It just kind of sits in the back of your mind..."

**Informal learning and problem profile.** Sam encountered both technical skill and knowledge and social interaction problems. In these problem profiles his experiences illuminated the influence of his frame of reference on his informal learning embedded in problem solving process centered on facilitating his students' learning.

One of Sam's early students, Pasha, was a non-aviation student. Pasha's priorities occasionally conflicted with his need to invest time and energy in the aviation class work to successfully complete the Private Pilot Program (Table 8). These problems required a series of interventions and catalyzed the process of informal learning for Sam.

Well he [Pasha] wanted to get off two weekends in a row. For visiting his sister, his family was coming to town. That was when it became tough because he was a senior, he was in four classes that he needed to graduate, had to attend these classes of course. Those were plenty more intense than what we were doing here.

Schedules and responsibility conflicts, both his and his student's, generated challenges for Sam and led to a need to renegotiate training times, missed opportunities to fly, and required an understanding approach to the demands of Pasha's priorities (Table 8.3). However, at times Pasha's pursuits impeded his progress in the aviation program and Sam's responsibility to complete the required training of his student in the semester. Sam came to realize that the student lacked the necessary motivation and focus to be successful in the course (Table 8.2 & 8.7). During this process, Sam initially allowed the student to give priority to other studies, while learning to recognize the point at which he would have to confront the student with the consequences of inadequate attention to the aviation program (Table 8.3 & 8.5).

My initial reaction was, well, but just do it, push it. As I told you about earlier and I was kind of, you know, you got to get this thing done, such is life. But, you know at the same time I said, you know, I said I'm not that guy...I understood where he's coming from.

The student's outside responsibilities resulted in declining performance and getting behind on the required flight time (Table 8.6 & 8.7). Sam repeatedly attempted to address the time priority but with little success as he was confronted with a series of schedule conflicts with his student. Initially, he allowed the student to meet other demands (Table 8.3 & 8.5), but as the schedule conflicts continued he attempted negotiation and compromise. He offered to give time for the requirement that Pasha felt he needed to attend to while Pasha would dedicate time and energy to the aviation requirements (Table 8.5).

With various failures to gain the needed dedication, Sam came to the realization that he needed to place additional responsibility on the student to provide the necessary attention to aviation to successfully complete the program (Table 8.2 & 8.7). He related, “...I said I’m going to have to put my hands up in the air, it’s your baby if you want this then you’re going to have to do it. Well, I had to tell him this is your job. I’m doing mine, you have to do yours...” (Table 8.5). However, this approach proved inadequate as well and Sam recognized that he had to confront the student more strongly (Table 8.2, 8.3 & 8.4). Sam informed the student that with the student's lack of focus on the aviation curriculum, he would not be able to successfully complete the private pilot program (Table 8.5). This conversation motivated Pasha to apply himself (Table 8.6).

Table 8

*Social Interaction Problem, Sam*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Poor student performance in the aircraft, and inadequate knowledge appropriate to a private pilot applicant.	Based on Sam’s aviation experience and established criteria (FEE).
2. Interpreting the Experience	a. Interpreted as a technical skill problem initially. b. - c. With failed interventions Sam interpreted the problem as being the product of the student’s failure to apply an appropriate focus and priority to the aviation task.	a. The student had trouble primarily with the development of the general skill to complete the private pilot program (FEE & FOR-U). b. - c. Sam’s interpretation is an evolutionary process in which he described the various stages of interpretation (FEE, SOC, FOR-U).

(continued)

Table 8 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy.	<ul style="list-style-type: none"> <li>a. Initially by-passed this phase utilized a usual response.</li> <li>b. Several iterations of strategy selection, implementation, and evaluation occurred in the process.</li> <li>c. Utilized a trial and error, collaboration, and experimental approaches.</li> </ul>	<ul style="list-style-type: none"> <li>a. Usual approach was a product of his own experience as a student (FEE, FOR-U).</li> <li>b. Founded on his frame of reference of his responsibility to work with and for his student's benefit Sam allowed space and provided opportunities for his student to resolve the attention deficit problem (BVR, SOC).</li> <li>c. Finally, his last selection is to confront the student with the probability of failure to complete the private pilot course (FOR-F, SOC, WE).</li> </ul>
4. Learning Strategies	<ul style="list-style-type: none"> <li>a. Educational history contributed to the early approaches.</li> <li>b. Collaboration and trial and error provide mid episode approach.</li> <li>c. In engaging with the social interaction problem Sam relied on his experience and frame of reference of what an appropriate approach to the problem should be.</li> </ul>	<ul style="list-style-type: none"> <li>a. Initial strategy founded on his training and experience in the aviation program (FEE).</li> <li>b. Sam credited the learning of these strategies as a part of his biography (SOC, FOR-F).</li> <li>c. When strategies failed to produce the expected outcomes the process of interpretation, selection, implementation and evaluation continued (WE, FOR-F).</li> </ul>
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Student was allowed latitude to pursue other responsibilities.</li> <li>b. Sam adjusted the strategy in a series of learning cycles moving to negotiation, then to emphasizing the student's responsibility.</li> <li>c. Finally, he confronted the student. He increased demands of the attention of the student's attention to the aviation program in a step-wise process.</li> </ul>	<ul style="list-style-type: none"> <li>a. At first Sam allowed the student to pursue other responsibilities (BVR, SOC).</li> <li>b. In implementing the strategies Sam's history of being open and socially understanding allowed the student excessive latitude (BVR, SCN, SOC).</li> <li>c. As a new instructor he re-evaluated and strengthened the requirements as he negotiated his way along the social dynamics with this student (WE, FOR-F).</li> </ul>

(continued)



Table 8 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<p>a. Failed usual approach required a return to examination of alternative approaches.</p> <p>b. - c. The outcomes continued to be unsuccessful as the student's performance failed to improve adequately. The student's attention to the aviation task remained inadequate. This ushered in the selection of another approach and continued the process.</p>	<p>a. Sam identified continued low performance and returned to consider and learn alternative solutions (FEE).</p> <p>b. - c. Identified the problem to be a product of a lack of attention by the student as a process of implementation, assessment, and re-interpretation (WE, FOR-U).</p>
7. Lessons Learned	Sam indicated that he informally learned through working with this particular student that clear direction was needed.	<p>The student's wide variation from Sam's expectations fostered challenges for his personal learning to deal with the focus and priorities of his non-aviation oriented student (BVR, WE, SCN, SOC, FOR-F).</p> <p>His lack of experience in teaching and the lack of knowledge of the respective responsibility of both the student and the instructor provided a process of learning his way to resolve the problem through a series of iterations (WE, FOR-F).</p>
8. Framing the Context or Reframing	Sam expressed the recognition of a need of holding the student responsible.	Sam had engaged with a transformation of his frame of reference based on this experience with a non-aviation student (WE, FOR-F).

Sam's informal learning was embedded in resolving the problems encountered with his non-aviation oriented student (Table 8.3, 8.4 & 8.5). The intertwining threads of the technical skill difficulties and the social interaction problem fostered an informal learning opportunity for Sam as he sought to lead his student to successful completion of the program while allowing the student to pursue other obligations as well (Table 8.2). Reflectively, Sam indicated that his easy going personality and efforts to please others, sometimes allowed his student to take advantage of him (Table 8.7 & 8.8). The process of increasing the severity of his teaching strategies he

attributed to his growing recognition that his student was not providing adequate attention to the aviation curriculum which was counter intuitive to his frame of reference (Table 8.7). This transformation of his approach to the situation indexed his learning and development during this informal learning episode (Table 8.8).

Sam's informal learning process followed a similar pattern to Peggy's process with a stepwise progression, requiring several iterations to come to resolution (Figure 11). With each trial and error iteration, he learned to become more aggressive in his approach. A reinterpretation of the core problem is represented by the segmented arrows. The overlapping nature of the phases is depicted by the overlapping boxes and the tacit and fluid nature of his informal learning process is represented by the segmented boxes. The process resulted in a transformation of his frame of reference about teaching and the aviation educational setting.

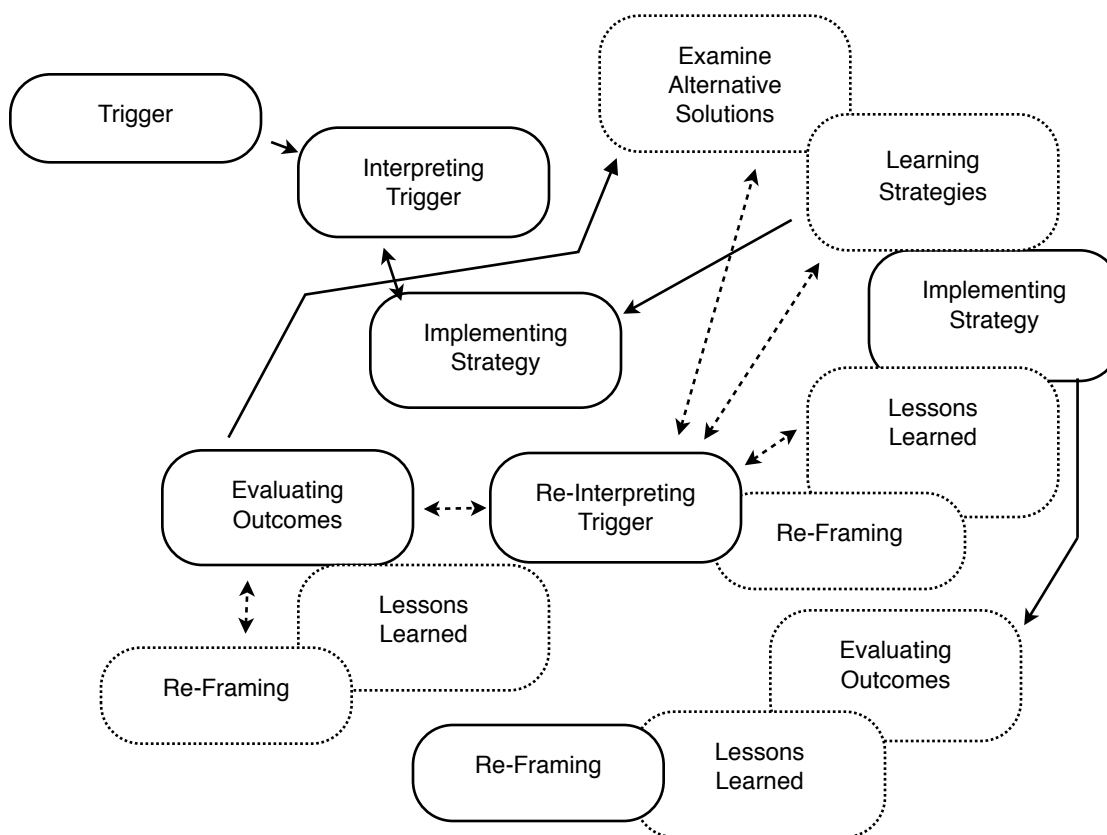


Figure 11. Informal Learning Process Map, Sam.

Sam engaged in an iterative process of informal learning moving through the various phases of the model. Sam evaluated the outcomes of the implemented teaching strategies and engaged in tacit informal learning while he re-framed his understanding. His frame of reference was adjusted and subsequently influenced his interpretation and strategy selection.

During Sam's second semester teaching he had two students. He said,

Richard he would come in with the I-pods on and sit [slouching] same tee shirt on every day same jean shorts, he never did laundry; he's living off his friend's couch for the summer you know. He'd sit down, and he just kind of put his head down not like the world was on his shoulders. I kinda like, "ok man you ready to learn?" And wait for David to come in, bright and ready to go, just showered and cleaned up himself. It was kind of like the differences of them, like one was eager to learn like David was like you mean to tell me that ... 'cus he didn't understand it cus a couple of times I caught myself. I was stuck here this summer with [remedial private pilot student] who heard that stuff so much more than any

[remedial private pilot student] ever with four times, with different instructors, and then you got David who is just getting out of [private pilot 1]...he going into [private pilot 2] fresh.

One was a student in the second semester of the flight program; the other student was making his third attempt at completing the second semester curriculum. This situation required Sam to employ a novel approach to meet the learning needs for each student.

So I found it especially taxing when I was sitting down there doing cross country planning...and he's [David] just looked at me like what? And Richard is like sitting over there like you know asked a couple of question 'cus he hadn't done it in a while...It was interesting how to balance this so I wasn't getting too in depth for him [David] and not holding him [Richard] back.

Finding a balance to foster effective learning for each student with their diverse learning needs opened new avenues for Sam's own learning. He said that for one student he had to provide foundational information while for the other he had to try to understand how someone might have to repeat such a course several times. He said this was difficult for him because he said he had not had any trouble during his aviation education. Reflecting on the needs of the student he said, "I went for motivation you know, I went this is all you have to do, I mean that was my initial instinct." Both students responded to his positive structured approach.

I made him go home and said you know, think about this, unless you can tell me what's going to go on in this flight. I gave him a list of what we were going to do for the next flight ahead of time, but I want you to tell me how this is done before we leave. So when he came in he had a sheet and I mean that helped once he knew what needed to be done, especially for the check ride.

He also felt that Richard's success could also be attributed to a change in pressure in the learning environment.

But um...with ah...I think that was one problem with Richard was, ah, that it was a little too much pressure for someone who so relaxed like Richard. But, you know at the end he said, "hey I appreciate it you know this semester has been different I think it has been more, kind of chill," you know, still in his low voice,

but a little bit more relaxing. And, you just told me what needed to be done and I think that kinda help verses just you know criticizing my performance, he said, “you kept me positive about it you told me what needed to be changed and that got me through it.” And that’s all he said.

Sam stated that the ability to apply a relaxed approach, or shift to an intense approach was a product of his nature and past experience. He indicated that recognition of the social dynamics and variation of his approaches were developed, at least in part, through experience in other domains such as school, work and social activity. The outcome of his learning resulted in an adjustment of his frame of reference of student diversity and his identity as a teacher which now included maintaining a strict line of focusing on aviation with students.

### **Jack**

I would say a good instructor is someone who realizes what his role is. It’s not to himself, it’s not to be here for a pay check, and it’s to help someone else succeed. An instructor relies on the performance of their students.

Jack’s frame of reference of what it means to be an instructor had been shaped from his own experience which had contributed to how he saw himself and what he felt formed his responsibilities as an instructor. The formation of his concepts of the role and responsibilities of an instructor were in alignment with his core values and acted as a filter for his daily experience. Jack said, “...how I am about myself is the success of my students is how I gauge my success...”

Jack expressed his concern for his students and others attributing this frame of reference as being a product of and consistent with his Christian faith. His student centered approach was important to him from the beginning of his teaching experience.

You know coming to that point, with those two students, you realize that you are responsible for their future. And they and this is the reason why you’re here. And they are looking to you to help them, to help them get there, you know. So I’ve I always tried to be the best instructor I can be. Making sure they’re ready, because

if I'm not doing it, then why shouldn't they be with a different instructor that's going to work hard for them, you know.

Jack's focus for his students, his relationship with his wife, extended family, and others were founded on Christian principles. These principles formed his beliefs and values and shaped his expectations and determined his relationships with others.

If you're a Christian, and you read the Bible, and you know, and something that I've always done, now that I'm thinking about it, where this comes from...is I would get so trodden down at those jobs, those tedious jobs I was doing and I'd read things like do things to the Lord, and I'd read that and then like I'd, okay, well then that's it, that's what I have to do there, and you learn to just do that job and do your best.

His parent's home was filled with acceptance and love, coupled with focused and regular attendance in Christian religious activities. This formed a strong moral compass which Jack embraced in personal devotion to Christian faith. These principles formed a foundational frame of reference for Jack by which he filtered, interpreted, and responded to the various events and situations of his daily experience.

I like other people to be satisfied with my performance. Even in my training, I worked very hard. I know that I'll keep doing a good job because I just want to do a good job. I think that's part of my personality.

As the son of a pastor, Jack embraced a frame of reference that shaped his understanding of the world. He related how this lens shaped his choices and behavior about a career, as an employee, and as a young husband. Because of these deeply held values he had a standard of acceptable behavior by which he filtered various situations. These values were shared by his wife along and both extended families as a part of a continuing family life history.

Jack was raised with an older brother in a small rural community in the midwest by loving parents. Jack said, "...through all my life I was just a normal kid..." His meaning of

normal was shaped by his unique experience that fostered his personal identity and outlook on all the facets of life. This frame of reference explained his experience for him and shaped his ideas about family, relationships, and responsibility.

I had a good family, and my parents loved me and my parents were married and [had] been married their whole life. I didn't have to deal with anything like divorce or...most of my extended family. We have a very loving family, love each other. So, I don't think I come from that background that's kind that kind a like broken or anything like that.

Jack frequently used comparison to express the meaning of the various stories of his biography. These comparisons were intended to foster a common understanding between himself and his listener. He compared families, focus and success in higher education, work responsibilities, and financial responsibilities.

I really took it [school] seriously that I was here to do this. I never just came in, and you know dreary eyed and didn't take a shower [slight laugh] or something like that you know what are we doing today. I always tried to be ready to go you know, because I really don't understand it if that's not what you're here to do then why are you here?

Jack illustrated how his frame of reference shaped his response to his experience in talking about his work history.

It's like I'm here and the Lord's given me this job and I'm doing my best at it. I find it very rewarding to see someone get something that they didn't have before; a difficult thing, because it's something I told them to do. I've never experienced anything like that, most of my jobs have been factory work tedious, you don't get to impart very much to someone.

Jack stated that in some cases his work was a matter of need so he worked for the extrinsic rewards to accomplish some other goal such as when he described working four jobs while learning to fly and courting his wife in a long distance relationship. Additionally, Jack

compared himself to others as an athlete, as a child in a small town, a married student in the university, as an instructor, and he compared his life to those less fortunate.

When Jack was about ten years of age his father became a pastor of a church. The connotation of his father's position provided a sense of responsibility. Jack felt that he had to adhere to a higher standard. "I think throughout my life people have always expected more out of me being a pastor's child. Especially with integrity and things like that..." Because of his father's position, Jack felt there were certain expectations of his responsibility and behavior, which implicated and influenced his relationship to others. This included his attitude and feelings of responsibility to work, school, and with interpersonal relationships.

He had begun his flight training outside a formal educational setting then continued in the university aviation program. Regarding the contrast he said,

I mean, I'm sure there's good instructors. But, I was out in the country too. So, I had a good ol' boy you know. I'd only been to a tower [controlled airport] environment a few times, so I did not know radio procedure very well at all. So I come in with this totally skewed view of procedures you know.

The experience of having been exposed to both the university and non-university training factored into his framing of the needs of students with a similar history of training.

As a teacher he said,

I don't stop giving instruction. I know some instructors just kind of sit there and watch time go by, but I really try to be an active instructor. I don't give up hope on anybody. And then, last semester I walked into the part time [hall] there was an instructor in there giving a debrief they walked [in] and sat down and the first thing he said is "well that was about the worst flight I've ever seen," he may not ever hear any thing that instructors going to say to him now 'cus he's thinking "you know do I really belong here?"

Each of these comparisons descriptively provided a lens to observe the practical application of Jack's frame of reference concerning various aspects of life and the influence of



his frame of reference on his understanding and response to experience. His ideas of teaching he accredited to his foundational beliefs, "...as far as instructing goes I think it [Christian faith and values] has everything to do with...ah...with the way I am you know. I wouldn't be the person that I am today if I wasn't that..."

His frame of reference, contributed to his meaning of being an instructor which implied practical implications. Regarding his responsibilities to his students he stated, "...because I don't want to let them down and that's what I'm here for. I always try to give that person kindness, and the fruits of the Spirit, then at other times strong words because we need to use them..." These core values of respect, diligence, and integrity created expectations for Jack as a teacher in the university aviation program.

**Becoming a teacher.** Jack tended to take personal responsibility for the shortcomings of his students to develop the necessary skills to meet the standards of the pilot program. He tended to exceed the contact hour policy requirements and sought various approaches to assist the students in their learning. The sense of responsibility for the student was seen, not only in the application of approaches to teaching, but in his affective response as the student struggled in the program. "I spent yesterday feeling bad, like I didn't do something enough for him...I know that's not the case..." Jack was disturbed that his student was not able to perform at the required level though his efforts had exceeded a reasonable and responsible level. He said, "...I think my mom, she was like that a lot. She wanted to know, she cared too, you know. I think it's just different when you just have somebody [that says] that's wrong or whatever, than somebody that really cares and wants to help..."

A career in aviation required the accumulation of pilot experience. This could be gained without additional expense by flight instructing. Jack's limited funds, self support for school, caring inclination, and the need of pilot experience made becoming an instructor a natural move for him.

Early in his experience as an instructor Jack had a student that had entered the aviation program having completed his Private Pilot Certificate outside of the university. He felt this would be a good fit as he had entered the program in the same way and anticipated that his student would be much as he had been.

I learned real fast. I had an instructor that we got along pretty good, but man I had a lot to learn coming in at first. When I came to the program, I found myself in a training environment to have been pretty subordinate to my instructor. There may have been times when I disagreed but,

Jack indicated that he had recognized his deficiencies as a student and adjusted his behavior. He learned to fly and also implicitly learned to teach. Jack's sense of responsibility, based on his values, shaped his decisions about his students. His work ethic, respect for instructors, and ideals of caring for his students were challenged in his early teaching experience and provided a catalyst for his informal learning.

**Informal learning and problem profile.** A technical skill problem manifested by one of his first students triggered an informal learning process for Jack (Table 9). The student had a tendency to over control the aircraft (Table 9.1). Though not unsafe, this tendency indicated a lower and unacceptable level of pilot skill (Table 9.2). Jack responded to the situation with a usual approach of verbal correction and demonstration yet the problem persisted (Table 9.3). After several iterations, while returning from a cross-country flight to the home base, Jack directed the student to sit on his hands and fly simply by utilizing rudder inputs until they

reached the point of needing to descend (Table 9.4). This method resolved the problem (Table 9.6). The student commented that the experience changed his ideas of controlling the aircraft, having never realized how much he was over controlling the airplane. This was an innovative approach derived from what he had learned from one of his instructors about the importance of rudder control during flight (Table 9.3 & 9.4). Jack had followed a usual pattern of verbally emphasizing and demonstrating but still did not get through to the student (Table 9.5 & 9.6). The novel idea of flying without the use of hands “seemed to be a way to go to the next strategy level” (Table 9.3, 9.4 & 9.5). Consistent with his frame of reference of a student centered approach Jack persisted in experimentation to raise the level of his student skill.

Table 9

*Technical Skill or Knowledge Problem, Jack*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Inappropriate control input and over controlling of the aircraft.	
2. Interpreting the Experience	a. Observed excess control inputs during level flight as well as other phases of flight.	a. Based on the instructor’s knowledge of the techniques of proper control input based on the higher level of knowledge of aerodynamic principles as well as developed skill and technique of the instructor (FEE, FOR-U).

(continued)

Table 9 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	<ul style="list-style-type: none"> <li>a. Initially by-passed this phase.</li> <li>b. Utilized verbal direction and demonstration.</li> <li>c. Jack developed and innovative approach to address the student problem by trial and error.</li> </ul>	<ul style="list-style-type: none"> <li>a. Routine response allowed the by-passing of this phase based on the experience and preconceptions of methods (FEE, WE, FOR-U).</li> <li>b. A series of solutions were engaged to resolve the problem. Jack chose from the normal set of resolution tools, verbal critique, demonstration, and trial and error, but without success (FEE, WE, FOR-U).</li> <li>c. The break down of the routine approaches facilitated the learning and development of an innovative method (BVR, WE, FEE, FOR-F).</li> </ul>
4. Learning Strategies	<ul style="list-style-type: none"> <li>a. Routine teaching approaches had been learned through the process of acting as a student as a by-product of Jack's own learning as a student.</li> <li>b. When the usual, routine method proved to be inadequate he continued with trial and error approaches.</li> <li>c. Jack experimented and learned to provide a novel approach.</li> </ul>	<ul style="list-style-type: none"> <li>a. As a student Jack had learned approaches to various problems (FEE, PCE, FOR-U).</li> <li>b. - c. Having recognized the need for a different approach Jack experimented with a hands off approach (FEE, BVR).</li> </ul>
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Jack originally utilized verbal correction and demonstration as a part of his usual approach, but without success.</li> <li>b. With additional iterations Jack derived an innovative approach to the problem.</li> </ul>	<ul style="list-style-type: none"> <li>a. Jack's use of verbal intervention was aligned with his frame of reference developed in his own learning experience (FEE, FOR-U).</li> <li>b. Jack extended the verbal and demonstration approach to remove the opportunity for the student to over control the aircraft (FEE, FOR-U).</li> </ul>

(continued)

Table 9 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	a. The failure of the usual teaching approach fostered a return to examine and learn alternative strategies. b. Original outcomes were unsatisfactory which culminated in re-interpretation and development of a new approach.	a. Ineffective approaches resulted in a return to examine and learn alternative approaches aligned with Jack frame of reference of teaching (FEE, WE, BVR, FOR-U). b. Additional approaches were implemented until success was achieved based on Jack's core values as an instructor (BVR, FEE, WE, FOR-U).
7. Lessons Learned	Jack learned about developing varied approaches to meet the needs of his students.	Jack added flexibility to his instructor frame of reference (FOR-F, WE).
8. Framing the Context or Reframing	Not explicitly articulated by the participant.	Positive reinforcement to his ideas and beliefs of being innovative as a teacher and the need to be flexible help to reshape Jack's frame of reference contributing to his recognition of new meaning for teaching (FOR-F, WE).

Jack's informal learning process is depicted in Figure 12. Similar to other participants, the process was initiated by a trigger and interpreted through his frame of reference as a filter for his experience. Jack initially addressed the situation with a routine instructional approach as depicted by the solid arrows and solid boxes. When this usual approach failed to produce the desired results, he returned to phases three and four to identify and learn an alternative approach as indicated by the segmented arrows. Some of the phases overlapped and were embedded implicitly represented by the overlapping boxes and permeable boundaries respectively.

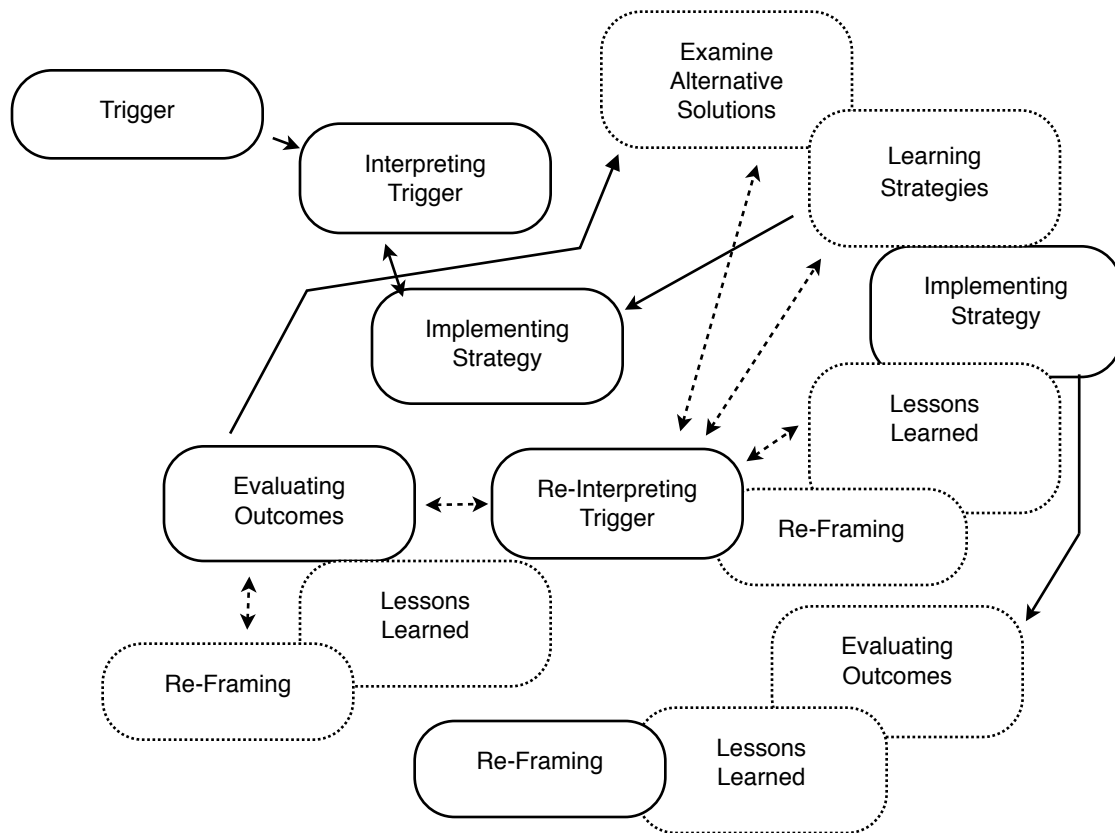


Figure 12. Informal Learning Process Map, Jack-1.

Jack said that, though technical skill or knowledge problem may defy easy solution and require repeated iterations through the informal learning and problem solving cycle, such problems tend to be less difficult and more clearly structured than social interaction problems. Jack remarked that social interaction problems were “more difficult to deal with” because they were ambiguous and ill defined.

A problem Jack had with another student he defined as having an “attitude” (Table 10). In some cases, an attitude problem manifested itself in the outward behavior of the student while in other cases it was more subtle and was identified only after failed attempts to resolve a technical skill or knowledge problem. Jack remarked in either case the problem of “attitude was the most difficult” situation to cope with for him as an instructor.

This student had entered the program with a Private Pilot's Certificate and having developed some competence in the aircraft began to respond inappropriately.

I've got a guy now that has a bit of an attitude problem. He's not proficient, but he's unwilling to take your help. I don't know if he feels like I'm dissing [disrespecting] him or something, but he's very standoffish. This is probably the most difficult time I've had with a student, and I'm getting attitude about this.

Jack experience as a student predicated that his student would be submissive and respectful of his instructor (Table 10.1 & 10.2). The student's disrespectful behavior conflicted with Jack's frame of reference about appropriate behavior in the learning environment. Jack indicated that he was familiar and comfortable with this process, "...I was really glad that I got that new private pilot [student] that first semester. Because I felt like I understood him a lot better than a lot of other people would, because I was trained Part 61 you know..." However, Jack's attitude had been respectful and submissive toward his instructor unlike his students.

Initially, the student's problem seemed to be a technical skill problem because his proficiency was not up to the standards (Table 10.2). Unsuccessful attempts to resolve the proficiency problem lead Jack to reinterpret the situation (Table 10.7 & 10.2). This led to identifying the core problem as a social interaction problem (Table 10.2 & 10.6). The recognition and re-interpretation of the situation was founded upon Jack's social understanding gained as a part of his experience outside of aviation (Table 10.2).

Once he got used to the plane and felt like he was doing well he felt like "I don't even need to do this, why am I paying for this," you know... I wasn't getting like the noises and the raised eyes eyebrows and whatever with him, but I could tell that he just felt above it.

These non-verbal cues were culturally defined and culturally interpreted symbols and a constant source of information during one's daily experience with others.

After several attempts to resolve the situation he directly confronted the student (Table 10.5). Jack said,

I just set him down and we just basically had the conversation that you do need to do this course even if you do come in with your private. You do take this course. I took this course you know. I get serious when I need to be with them.

The outcome was successful as the student's "attitude" problem was resolved and the technical problems could be addressed again (Table 10.7).

Table 10

*Social Interaction Problem, Jack*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Though a Private Pilot the student lacked key skills.	
2. Interpreting the Experience	a. Observation of the student performance fostered an interpretation that the student needed to develop additional knowledge and skill. b. Additionally, as a part of an iterative process Jack had noted that the student manifested an inappropriate attitude that undermined the ability to effectively address the technical skill problem.	a. Jack having entered the aviation program in a similar fashion as a private pilot, recognized his student's need of additional training to meet the more stringent standards of the university program (FEE, PCE). b. The attitude problem was recognized by the comments of the student and the non-verbal cues that Jack perceived (SOC, SCN). This perception was a function of the Jack's frame of reference (BVR, FOR-U)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	a. Initially he allowed the student to have the opportunity to self correct. b. Selected a more direct approach c. After unsuccessful approaches he chose direct confrontation.	a. Jack proceeded with a low level intervention initially based on his experience and frame of reference (PCE, FOR-U). b. - c. As the outcome failed to be effective the measures he selected became more direct and stringent (SOC, FOR-U).

(continued)



Table 10 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
4. Learning Strategies	<ul style="list-style-type: none"> <li>a. Technical skill problems were addressed with approaches gleaned from Jack's experience as a student.</li> <li>b. Jack indicated that the strategies which he used for the social interaction problem were learned as a part of growing up.</li> </ul>	<ul style="list-style-type: none"> <li>a. With regard to the technical skill problem Jack provided approaches that he had developed as student or learned from his own instructors (FEE, FOR-U).</li> <li>b. - c. As to the social interaction problem these were more intuitive in nature (SOC, SCN, FOR-U).</li> </ul>
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Jack implemented several approaches in attempting to resolve the technical skill problem. However, the social interaction problem impeded progress.</li> <li>b. He began with a less intrusive approach when this was ineffective he moved through additional iterations.</li> <li>c. Finally, he utilized a direct approach by speaking plainly to the student.</li> </ul>	<ul style="list-style-type: none"> <li>a. Jack's frame of reference of the learning environment included a positive relationship between the student and the instructor (BVR, FOR-U).</li> <li>b. - c. In interacting with this student he made adjustments to his frame of reference and selected approaches to resolve the issue progressively increasing in severity through iterations (FOR-F, WE).</li> </ul>
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<ul style="list-style-type: none"> <li>a. Jack observed that with the initial interventions the student's performance remained sub-standard. This generated a selection of another teaching strategy.</li> <li>b. Later interventions were progressively intensified to achieve a resolution to the problem through trial and error.</li> <li>c. Direct confrontation provided satisfactory outcome.</li> </ul>	<ul style="list-style-type: none"> <li>a. This assessment was founded on the beliefs and values that are a part of the instructor's frame of reference of what was appropriate and acceptable behavior for the instructional environment (BVR, SCN, WE, FOR-U).</li> <li>b. With the implementation of more stringent approaches unsuccessful interventions were adjusted (SOC, FOR-F).</li> <li>c. Change in attitude evaluated by his social experience in accordance with his frame of reference of an appropriate environment (SOC, FEE, FOR-U).</li> </ul>
7. Lessons Learned	<ul style="list-style-type: none"> <li>a. Jack learned that addressing the technical skill problem was impeded by the social interaction problem.</li> <li>b. Jack came to the realization that he must confront the attitude problem directly.</li> </ul>	<ul style="list-style-type: none"> <li>a. Founded on a sense of being forthright coupled with being sensitive to others in accordance with Jack's frame of reference (WE, SOC, FOR-F).</li> <li>b. Learned the variance in the perspective of students and the need of applying measures to social interaction problems (SOC, WE, FOR-F).</li> </ul>

(continued)

Table 10 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
8. Framing the Context or Reframing	Not explicitly articulated.	Jack referred to the experience with social interaction problems as reshaping his ideas of interaction with his students.

The trigger prompted an interpretation followed by a selection of a probable solution which was then implemented (Table 10.2, 10.3 & 10.5). Evaluating the outcome (Table 10.6), Jack returned to the interpretation phase (Table 10.2), informally learning and reframing the situation (Table 10.7 & 10.8) while he considered choosing, and implementing an alternative approach (Table 10.3 & 10.4) until a resolution was attained (Table 10.8).

The next semester Jack was faced with a similar situation, however this problem was different in intensity (Table 11). He said, "...last semester the attitude response was good. He started performing better. This semester, the guy who has the attitude thing, just gets his spirit broken any time there is a bad thing about a flight and he comes to the next flight drooping head..." The student had various technical skill and knowledge deficits which Jack addressed with an approach that had been successful for some of his other students (Table 11.1 & 11.5). The student's skill did not improve and demonstrated a lack of respect demonstrated for Jack. Jack indicated, "...he'd either come to the next lesson like very wary and very unprepared and not ready to go, doesn't know what's going on. Or it would be like 'I don't know why you said all that to me yesterday you're, you're a jerk' is his attitude towards me..." (Table 11.6)

I remember one time we had a bad flight. We had to continue the next day, and I was like "okay we need a look at the maintenance logs." So we go out there and I explain the maintenance logs showing how the inspections are made, recorded,

discussing which ones we absolutely have to have. About halfway through he just reared back and does this thing like [indicating irritation], just kind of looking out and I'm like, "what am I?" That's something that just happens you can't even really be prepared for something like that. It's only me and him we're sitting out there in the cafeteria in the maintenance building. I'm like talking to you know you might as well be talking to thin air, he is not looking or listening at all.

This was a difficult situation for Jack to interpret and understand. He was faced with the difficulty of not being able help the student through the technical skill and knowledge difficulties because the student would not participate in the learning endeavor. He told the student, "we're a team here," (Table 11.5).

Reflecting on this situation he said that he believed that this student had a problem "subjecting" himself to him as his instructor (Table 11.2 & 11.8). Jack, as a student, had maintained a good relationship with his instructors and this formed a key aspect of Jack's frame of reference as a teacher. Jack continued to work with the student striving to find a solution but at the end of the term he determined that the student still lacked the required proficiency (Table 11.5). It was evident that the student had assumed that he would be allowed to take the practical test regardless of his proficiency (Table 11.6). Nevertheless, Jack took a firm stand.

He's not doing good [poor performance]. I really think his attitude comes from he can't do what I've ask them to do. He never thought; he was thinking all semester that he was taking this check ride. When it gets to this point though facts are facts. I can't send the guy out there.

Jack's sense of responsibility which governed his decision about his students had been founded on his beliefs and values and transformed through his informal learning.

It's not in the way that I go about instructing but the way I believe that an instructor should be and his or her responsibilities. I learned that my first semester. I was a little intimidated by having actual students. As the semester went on I felt more in control. I was waiting for their respect, trying to earn all of their respect, wanting just hoping that they were going to be subordinate to me as time went on. I realized that I had the final authority of the flight. I am

responsible for that flight... I've learned that all I owe a student is my best instruction.

Though he suffered adverse emotional feelings, Jack followed his values and developed a new awareness of his responsibilities and reframed his identity as a teacher (Table 11.7 & 11.8).

Table 11

*Social Interaction Problem, Jack*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Lack of key skills and adequate knowledge.	
2. Interpreting the Experience	<p>a. - c. Jack interpreted the skill problem based on the demonstrated lack of proficiency and knowledge.</p> <p>d. Having had failed attempts through normal approaches Jack re-interpreted the experience as a social interaction problem.</p>	<p>a. - c. This determination was founded on Jack awareness of the criteria for the private pilot course (FEE, FOR-U).</p> <p>d. With the failed approaches founded on non-verbal and verbal cues Jack re-interpreted the core problem (SOC, BVR, SCN, FOR-U).</p>
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	<p>a. Initially by passed this phase.</p> <p>b. Usual approaches without success resulted in seeking alternative approaches.</p> <p>c. Intuitive responses to social interaction problem, unresolved.</p>	<p>a. Jack indicated that he had standard approaches that he used on particular areas (FEE, PCE, BVR, FOR-U).</p> <p>b. - c. With the technical skill issues Jack went through several strategies in an attempt to resolve the problem.</p> <p>c. Finally, he elected to recommend the student for more training (BVR, FOR-F)</p>
4. Learning Strategies	<p>a. Jack had learned strategies that were effective for him as a student.</p> <p>b. When these usual approaches failed he resorted to a second line of approach intuitively.</p> <p>c. In regard to the social interaction problem there was no apparent resource but simply the trial and error approach of feeling his way through the situation.</p>	<p>a. c. In regard to the technical skill problems Jack relied on his history of being a student, utilizing the method that had been effective for him as a student (FEE, PCE, FOR-U).</p> <p>b. - d. As he engaged the social interaction issues he relied intuitively on his social experience (SOC, BVR, FOR-U).</p>

(continued)

Table 11 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Jack utilized repeated instruction over areas that the student lacked knowledge in.</li> <li>b. - c. In encountering the attitude problem he tried several teaching approaches but without effect.</li> <li>d. At the end of the semester Jack felt that he had no alternative but to recommend remedial training for the student.</li> </ul>	<ul style="list-style-type: none"> <li>a. This was an established method of instruction in skill development (FEE).</li> <li>b. - d. These intuitive attempts to remediate the problem reflected the basic values structures that Jack held to in desiring the successful completion of the course (BVR, SCN).</li> </ul>
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<ul style="list-style-type: none"> <li>a. - c. As Jack worked with the student, each unsuccessful attempt to resolve a technical or social interaction problem resulted in an evaluation and re-entry into the problem solving and informal learning process.</li> </ul>	<ul style="list-style-type: none"> <li>a. - c. The outcomes were outside of Jack's expectations not conforming to his frame of reference (FOR-U).</li> <li>b. - d. Through these iterations which required repeated evaluation and re-engagement with interpretation, selection and learning of new strategies. Implementation and evaluation were interwoven in each phase with learning (FEE, SOC, BVR, FOR-F).</li> </ul>
7. Lessons Learned	Attitude problems are not all the same and require various approaches.	<ul style="list-style-type: none"> <li>a. - c. Jack indicated that he had standard approaches that he used on particular areas but had learned that if these were not successful that he would vary the approach (FEE, SOC, BVR).</li> <li>d. Jack indicated that he would deal more directly and early in the process to eliminate the problem generated by and attitude problem. (FOR-F, BVR, WE)</li> </ul>
8. Framing the Context or Reframing	Change in ideas about addressing attitude problems and other social interaction problems.	Jack's commented that in the future he would be more prompt to address social interaction problems (BVR, FOR-F).

Jack's informal learning process followed a pattern as depicted in Figure 13. In this more complex situation Jack initially responded with a usual teaching approach depicted by the solid arrows, but had to return to reinterpretation and the third and fourth phases to develop additional teaching strategies as depicted by the segmented arrows. Continuing to work to resolve the

problems required continued informal learning of alternative procedures as Jack learned his way to a resolution as depicted by the segmented arrows. Some of the phases overlapped and were embedded implicitly represented by the overlapping boxes and permeable boundaries respectively. Retrospectively, Jack reframed his responsibility and identity as an instructor founded on this experience.

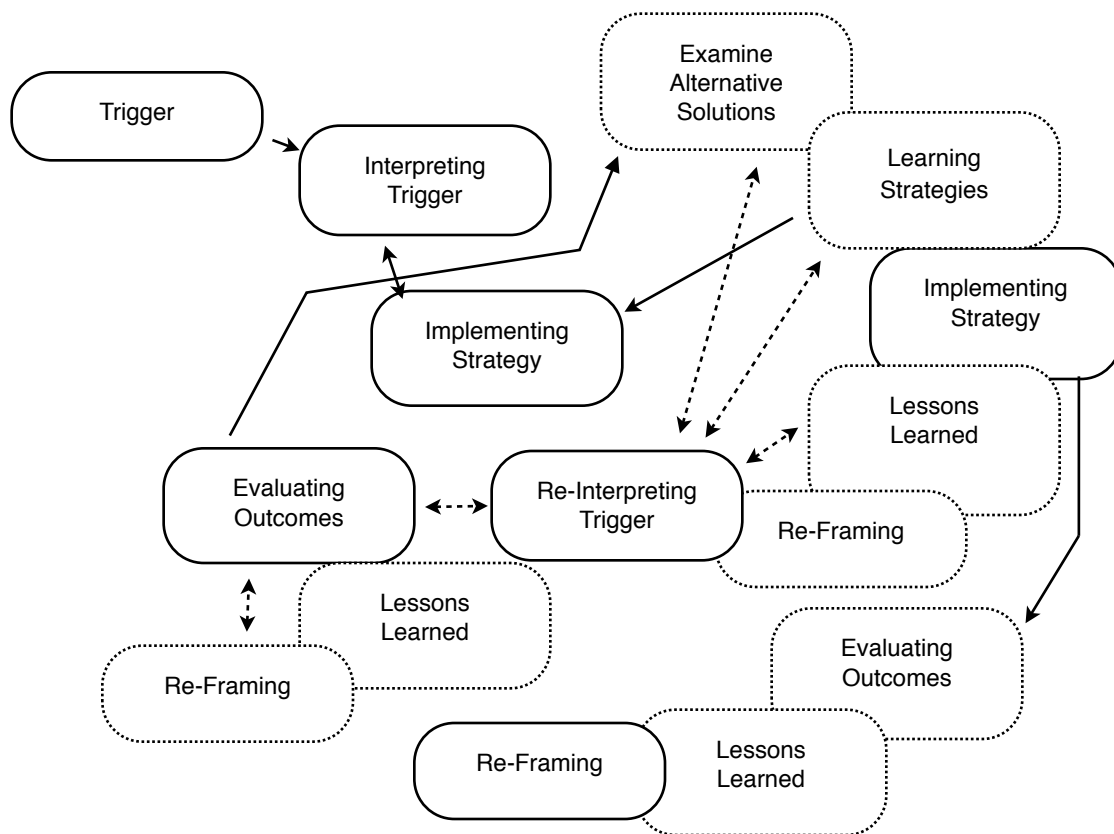


Figure 13. Informal Learning Process Map, Jack-2.

These two accounts of students with “attitude” problems illustrate how social interaction problems may vary in characteristics among different students. Social interaction problems often are attended with emotional difficulties for the teacher as well as the student. The interference of the social interaction problem contributed to the student’s lack of success, leaving Jack feeling

that he had let the student down or had in some way failed in his responsibilities. Jack had interpreted the situation in concert with his social experience influenced by frame of reference (Table 11.2 & 11.6). He had considered, chosen, and implemented teaching strategies to attempt to resolve his student's learning problems (Table 11.5 & 11.6). These strategies were traced to approaches that his own instructors used, strategies he developed through an innovation, trial and error, and through collaboration with other instructors (Table 11.2, 11.3, 11.4 & 11.6). Ambiguous social interaction problems stimulated strategies were intuitive and may be traced to an experience in one's social milieu in concert with one's frame of reference of teaching (Table 11.4, 11.5 & 11.6). Outcomes of Jack's informal learning process yielded new strategies and alter his frames of reference of teaching (Table 11.8).

I think as far as attitude goes, that needs to be the first thing that's controlled. I think if this happens again I will handle the attitudes differently. It's good that it's happened because it's taught me a couple of those lessons. I need to be able to show the strength of an instructor as that final authority of the flight. I am really the pilot in command he's just the student.

## **Shiloh**

Shiloh grew up in a mountain town with a comparative small population. Family interaction was an important aspect in her life experience. Her mother provided extraordinary opportunities for her family through her teaching career. Her father worked in various business and participated in the local government. The experiences of camping, hiking, tennis, long term relationships with school friends, and a special closeness to her mother shaped her values of family, friends, and relationships. Travels with her family led to interacting with people from different cultures and places. These opportunities formed and appreciation for those that were

from different places and cultural settings instilling an openness to others reflected in other in her biography.

Before she was born, Shiloh's mother found a teaching position in a small mountain town in Colorado while on a trip with her husband, Shiloh's father. This enabled them to remain in the area to raise their family.

I've been in the same house, in the same town, my whole life. My Mom is a retired high schoolteacher, and now she works as an assistant manager at a retail shop just to keep busy. My Dad, right now, is an administrator for a landscaping company. He's also involved in local government, and he's on the town council.

Shiloh and her older brother enjoyed a life style that developed long term relationships through school and extracurricular activities such as dance, snow skiing, and tennis. She remarked, "...I always danced, when I was younger up to high school, danced, jazz, tap, ballet, up through high school. Then when I was in middle school I started doing like competition and things like that..." Being from a small mountain town meant that school and outside activities were attended by many of the same children fostering life long relationships.

I grew up with a lot of people. There were about four elementary schools in town when I was growing up and then they all fed into one middle school. And then that middle school fed into the high school. So basically if, if we haven't been with these people since kindergarten, which a quarter of them had been together with them and then if not, then we started in middle school. We were with them in middle school. So we really knew a lot of the people.

Involvement with others through different activities was a prominent theme for Shiloh.

My best friend, who was Karen, she went to a different elementary school. So I met her in 6th grade. We worked on a group project right at the beginning of sixth grade and kind of became friends but not good friends...then by seventh grade we were best friends and inseparable. Well she danced as well, but when we were younger we went to different dance studios...then I ended up switching to the studio where Karen went, and so we ended up being together through school and being on the dance team together so we spent a lot of time together. So we were really close.



These relationships sometimes spilled over into other areas of involvement such as school, extra-curricular activities, and community service. Even after she went away to college they continued in close contact. Some of her close friends attended institutions of higher education, or worked away from her home as she had, but stayed in contact and reconnected often.

Karen and then two other girls and I are really close even now. We had other friends that were kind of in our group as well but the four of us were really close...we've come back from school, and we've had a tradition over winter break we have a dessert party that's also a sledding party. So we'll get together, and we'll bring a dessert, I mean it's not just the four of us it's a group of our friends and um, we eat the dessert and then well go sledding outside...So we just have fun.

Friends traveled great distances to visit her while she was in her college and on breaks they enjoyed special activities.

My mom and I like to spend time together and do some sort of activities. Usually we'll go out to dinner or something like that. We play tennis; I also did the tennis team in high school and tennis lessons growing up because my mom was always interested in tennis. So we played tennis, or we'd go get our nails done. Just kind of did a hang out thing.

Her mother had included her in some of her teaching activities as a child and over the years had exposed her to the world of a teacher. Shiloh was aware of a number of her mother's strong relationships with former students that had been maintained throughout the years. Her mother continued to be open and personable after her retirement from teaching. This formed a culture of cultivating and maintaining relationships as a pattern for Shiloh.

Shiloh became quite active in student government as well as continuing her activities in dance and tennis. Her reflections on her high school experience, particularly the lack of school spirit, influenced her college selection.

I went to a small high school, and when I was there, unfortunately there was not a lot of school spirit. Most of the sports teams were not very good, and I think I wanted something different than that. I wanted to see what it was like to be a school with big sports, good sports, school spirit people excited about it, and I mean I wanted a change I guess from the high school.

Her experience in high school stimulated particular notions she desired for her “college experience.”

I wanted to go to a big school with sports and academics. I wanted to live in the dorms, I wanted to be able go sporting events, to have school spirit you know, to be evolved and otherwise have good academics as well. I found what I was looking for, I was always happy with my deciding to come here. It was hard because I was going so far away, and you know, leaving my good friends. But, I’ve learned that I’ve been able to maintain those relationships.

Having chosen to pursue a career in aviation narrowed her selection and required attendance of a school beyond her home state. Her framework for selecting a college was influenced by her experience coupled with her career and academic goals. Some of these ideas about college had been influenced through popular media, such as television and movies and was certainly different from her mother and father’s experience of going to a local college while living at home.

Shiloh became a resident on an all female floor of a co-ed dorm during the beginning of her college experience. The social interaction on the floor helped to develop additional lasting relationships. In her second year, girls on her dorm floor influenced her to join a sorority. She said, “...they were all saying are you going to do this are you going to go through recruitment for the sorority...I said I don’t know what that is; no I’m not going to do it...” Nevertheless, through the persuasion of the other girls of the dorm floor she joined a sorority and moved into the sorority house.

The sorority reshaped her experience of college. She remarked, "...well most of my closest friends here actually are because I was in a sorority. So I was in a sorority, and I have some really great friends but I met them and lived with them..." Rushing brought her into contact with a different college experience and new relationships which fostered new friendships and activities. While in the sorority house, she participated on several committees one through which she became affiliated with a child mentoring program.

I started doing Big Brothers, Big Sisters. In fact, I'm mentoring a 12 year old girl. So I've gone there once a week for the past two years, and I really enjoy that program...I started when she was ten and I, I just would go and we would just hang out and play and do different things and um she was just always excited to see me and it was just a great, you know positive thing for her and I could see that this was really good for her and that would make me feel good and want to do it even more.

Embracing this relationship had reciprocal value in providing a sense of satisfaction by giving to another who appreciated the attention and interaction.

Shiloh's caring nature was illuminated in this relationship marked by her investment in her little sister. Shiloh's satisfaction in the intrinsic rewards of doing and being concerned for others was characteristic of her relationships. This theme was part of her mother's identity in giving to others, both students and those she had come to know in her travels. On one occasion her mother had sent a cart full of flip-flops to an African community from which she had recently returned from a teaching exchange program because she had noticed that many of the people had no shoes. Additionally, Shiloh and one of her close friends from school volunteered in a soup kitchen for the homeless. This culture of care was further shown by her recently donating her hair to a charitable organization that assists child victims of cancer. This culture of care for

others had been a part of her lived experience from childhood through the influence of her mother and friends forming a strong tenant of her frame of reference.

Teachers played a big part in Shiloh's lived experience.

My mom retired from teaching the same year that I graduated from high school. She taught French, and I know she always loved it. She would always say things like, ah, "I don't know how you could teach math, with French I get to go to the museums, and I get to go to the French restaurant and go take my students to see French films and then I get to take trips to France." She thought this was the best thing to be teaching.

The positive aspects of her mother's engagement in teaching fostered a frame of reference that valued teaching and teachers. She said, "...I always thought that if I didn't do aviation I probably would have become a teacher...teachers have always been very respected in my family probably because we have teachers in my family..." Her mother's stories and experiences shaped Shiloh's framing of teaching.

Like she'll run into former student's and they'll say, "oh I ended up majoring in French" you know, and these are students that she wouldn't have expected and she was surprised you know, "so I must have had some sort of impact on them"... So then she'll find other students that will say, "oh I'm teaching French now"... and these are things she wouldn't have guessed. I know she [Shiloh's mother] told me a story recently of how this one student of hers ended up going to France and marrying a Frenchman and how she had stopped taking French in college, but now she was going back to what she learned in high school, and trying to re-learn things. So I think that a lot of that, the influence that she had on students and you know the positive feedback that she had and things like that.

This atmosphere placed teachers in a special light which valued teachers and teaching as a career field. Other teachers had also shaped her concepts of teaching.

I think that I've had a lot of instructors and teachers in the past that have influenced me. I'm thinking back to high school and you know, a lot of times my favorite teachers were from my favorite classes and that's because the way they organized their class, conducted their class, kept people involved in their classes,

made me like their classes the best, made you like them as an instructor as well as a teacher.

She became a teacher of younger dancers for a time. She said, "...my junior and senior year I was teaching. I felt I learned so much from these kids, these five-year olds, and they're just always so positive and excited and they say funny things that make you laugh all the time..." Her time of working with younger children helped her developed both as a dancer and as a teacher.

Along with her mother and dance teachers, she engaged with teachers through daily school experiences as well as special activities. Reflecting on the influence of teachers, she identified specific characteristics that were most effective and rewarding for her. Having the opportunity to instruct she said, "...I just think that's something [teaching] that I would enjoy as well. So being a flight instructor I kind of get to do both..."

Shiloh was able to travel internationally because her mother participated in a teacher exchange program. The family lived for several months in France which gave her an opportunity to interact with other children from a different culture. Through this experience she recognized their shared interest though of a different cultural, language, and background.

We were in a small town and so every one was really nice and really welcoming to us. We met all of our neighbors you know. I met kids in the neighborhood and just kind of like at home, we'd go out and play after school.

Her introduction to aviation had to do with being a part of a family that traveled.

My family liked to go on lots of vacations when we were younger it kinda more road trips. My family started to go to Mexico, we went the first time when I was five, we have a time share there, so we pretty much go every year to Mexico, and then when we went to France. Obviously we were flying, and I think it was pretty much on the flight to France I said I love flying this is so much fun, and I think is was 10 years old, and I was on that eight-hour flight, and I loved it, I want to be a

pilot and that was pretty much when I came up with the idea that I wanted to be a pilot.

A few years later, through a high school job shadow program, she was able to go on her first flight in a small aircraft. She had contacted a local airport and visited a flight school. She was given an introductory flight and observed the flight instructor and the flight operations. She returned home wanting to take flying lessons. Her mother convinced her to wait until college. This became foundational in her determination of an appropriate college as she desired to pursue a degree associated with aviation among other academic and institutional requirements.

**Becoming a teacher.** Having brought a background of teaching with her to college her development as a teacher continued during her experience in college through both positive and negative educational experiences.

I had one instructor and he kind of seemed like he was at the end of his...it was right before he moved on from here and he seemed like he was sick of instructing and that came through...every day... I wanted to be motivated, and he would kind of suck that out of me almost...and...he didn't care if I did well and we were really far behind and he didn't want to fly extra...and...it was very frustrating.

The disappointment and discouragement that could be wielded by an instructor was keenly felt by her and helped to shape her ideas of the responsibilities of flight instructor.

He didn't care if I did well, and it just really showed me. It didn't seem fair to me, it was frustrating; it was discouraging. I wanted to work hard and...but yeah...So I want to be motivated as a person and that. I'm there to help and try to be personable too.

Shiloh learned indirectly as a student to be a teacher, considering an interest and concern for the student's wellbeing. Teaching the subject material for her was a part of the instructor's responsibility. She said, "...that was an awful experience. I can't do that to my students...I

think I've taken things from other instructors, things that I've liked and tried to use them and things that I didn't like..."

Her experiences taking and teaching dance, engaging with her teachers, learning from her mother, and through flight training, formed her frame of reference and shaped her identity of being teaching and making a good learning environment.

I think for me what I try to do to be a good teacher is that I try to show my students that I, you know care. I want them to see that this is not just a job for me but...I've had a total of six students...with each student I've had different challenges with each student.

Having had a good experience of teaching the younger students of dance and the positive experience that she had through her mother's teaching career, Shiloh's expectations of teaching in aviation were very positive. She found her experience translated to strategies for her flight students.

I mean it's pretty different having college students verses kindergartners, but as far as actually teaching it is actually similar. I was teaching beginners in dance and so you have to really break it down, especially for five-year olds. You really need to break things down so they can understand it...and that very similar with flight students. I mean you really have to break things down; you have to explain it, and show them.

To the flight instructor arena she brought with her methods, strategies, and ideas of being a teacher founded on a frame of reference that had been developed through her experience since childhood.

**Informal learning and problem profile.** Shiloh's first semester of teaching in the aviation community enhanced and reinforced her frame of reference through the motivated response of her two students. She indicated that they "tried really hard and struggled here and there but basically didn't have many problems with them."

The next semester she had students who were “not as motivated,” struggled with skill and understanding. This forced her to develop alternative strategies, particularly to address the motivational deficit of the students (Table 12). Such a low investment in learning to fly demonstrated by these students was in conflict with her frame of reference and expectations of students. She remarked, “...it kind of goes back to thing about disciplining my dance students and not giving them stickers. I felt kind of the same way here, so I learned to be just a little more forceful about it and more serious...” The similarity of these experiences involving discipline problems provided a frame of reference from which she interpreted and addressed the situation.

She attributed the recognition and interpretation of these motivational issues to observation of the non-verbal cues and lack of progress of the students. She said, “...when there’s not as much motivation you give them feedback and they don’t even hear it...and then they don’t change...they don’t apply it and you give them the same feedback and its kind of this cycle...” Her social interaction experience provided an interpretive reference (Table 12.2). Though she attempted to address the technical problems of the students, the social interaction problems generated interference that had to be resolved, to make the necessary gains in the technical skill problems.

Through several iterations, she gradually used more aggressive measures to remediate the social interaction problem. She said, “as you’re not seeing improvement and you’re not seeing a change in their behavior, then you have to become a little more serious about it. A little more strict.” Her informal learning continued as she reinterpreted the problem (Table 12.2), then searched and learned alternative approaches (Table 12.3 & 12.4), then implemented them in a trial and error process (Table 12.5).



This social interaction problem came with emotional conflict which further complicated the learning environment, and challenged her frame of reference. Her experience with the apathetic instructor had instilled in her a desire to be motivated, understanding, and to avoid being severe. After several iterations she directly confronted the students to correct the inappropriate behavior much as she had her young dance students (Table 12.5, 12.7, & 12.8)

Table 12

*Social Interaction Problem, Shiloh*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Poor student performance in the aircraft.	Based on her aviation experience and established criteria.
2. Interpreting the Experience	<p>a. – c. Interpreted as a technical skill problem.</p> <p>d. Interpretation of the social interaction problem was embedded with the evaluation, lessons learned, and reframing phases as a part of the iterative process.</p>	<p>a. –c. Based on her assumption of student intent to learn as she had intentionality in learning as a student (FEE, PCE, FOR-U).</p> <p>d. The interpretation of the social interaction problem was a function of Shiloh's evaluation, learning, and reframing phases of the informal and incidental learning process (WE, SCN, SOC). She based her interpretation on the student's observed behavior in the light of her frame of reference of appropriate behavior in an instructional environment and her social awareness (SOC, FOR-U).</p>

(continued)

Table 12 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	<p>a. This phase was by-passed initially with the implementation of her usual teaching approach.</p> <p>b. –c. Returned to examine alternative teaching strategies.</p> <p>d. After a change in the interpretation of the trigger the severity of the selection of solutions increased intuitively.</p>	<p>a. Usual approach was a product of her own learning as a student (FEE, PCE, FOR-U).</p> <p>b. –c. Multiple choices were available to address the technical skill problem based on her own learning as a student, literature available, and collaboration with other instructors (FEE, WE, SOC, FOR-U).</p> <p>d. As Shiloh address the social interaction problem, she utilized a more intuitive approach and bypassed examining alternatives. She reacted intuitively to the demonstrated problems founded on her frame of reference of social interaction (BVR, SOC, SCN, FOR-U).</p>
4. Learning Strategies	<p>a. –c. In addressing the technical problems there was no explicit record of the origin of the methods.</p> <p>d. As Shiloh engaged with social interaction problems she relied on intuitive responses to the observed behavior of her students.</p>	<p>a. Strategies were established in routine situation requiring only implementation (FEE, FOR-U).</p> <p>b. –c. Feedback, and critique had been a part of Shiloh's teaching method in both learning and teaching dance and were a part of the curriculum in instructor training (WE, IEE, FEE, FOR-U). She used collaborated and reviewed literature as a part of the examination and selection of alternative solutions (FEE, WE, SOC).</p> <p>d. To resolve the social interaction problem her frame of reference was challenged as the behavior of the student diverged from her beliefs of what constitutes appropriate behavior in the learning environment. The strategies she employed mirrored those she had utilized with children as a dance teacher and reflected the reliance on her social interaction experience (SOC, SCN, FOR-U).</p>

(continued)

Table 12 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
5. Produce Proposed Solutions or Implementation	<p>a. - c. Implemented critique as feedback of observed problems as a usual approach. After interpreting that the student's behavior reflected a social interaction problem she engaged in a series of iterations of interpretation, selecting an approach, implementation, and evaluation to attempt a successful resolution. She implemented verbal correction, additional corrections, and direct confrontation of the students.</p> <p>d. The intensity of the measures gradually increased in severity through a trial and error process.</p>	<p>a. -c. The implementation of critique and feedback had be a part of Shiloh's approach to dance students as well as a part of the instructor training regimen (WE, FEE, FOR-U).</p> <p>d. With her recognition of the social interaction problem Shiloh employed intuitive responses as a part of an iterative process striving to attain some resolution (SOC, SCN, FOR-U).</p>
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<p>a. -c. Inappropriate student response generated a re-interpretation and utilization of additional teaching strategies to address the problems.</p> <p>d. Intuitive response to social interaction problem relieved some of the situation.</p>	<p>a. Based on her experience with social interaction, she determine that the action of the students in indicative of not paying attention and would be non-productive in developing the appropriate skill set (SOC, SCN, FOR-U).</p> <p>b. -d. This phase is integrated with learning and reframing the problem as a part of an interpretive phase with each iteration of the learning process (WE, FOR-F).</p>
7. Lessons Learned	<p>a. Shiloh encountered an obstacle to addressing the technical skill problem and learned the need to change approaches.</p> <p>b. -c. The situation was unresolved which commenced additional iteration of the problem solving and learning process.</p> <p>d. Shiloh learned to be more forceful.</p>	<p>a. Usual approaches failed which required a return to examine alternative approaches (WE, FEE).</p> <p>b. -c. Increased severity of interventions were required (SOC, FOR-U).</p> <p>c. Learned that in some cases she must take a more forceful position though contrary to her frame of reference (FEE, WE, BVR, FOR-F).</p>

(continued)

Table 12 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
8. Framing the Context or Reframing	Shiloh determined the underlying problem of student motivation was impeding effective progress in resolving the technical skill problems. As a part of reframing the problem there was the interpretation of an additional underlying social interaction problem. This changed how Shiloh framed the situation. After several iterations she indicated that she had learned that she must be more strict in her approach. This was indicative of adjustment in her frame of reference of teaching.	This experience generated a reframing of Shiloh beliefs about teaching which resulted in an adjustment to her frame of reference shaping interpretation, strategies and learning for future engagement (FOR-F).

Having to act with this level of severity raised conflicting emotions for her as she didn't want to be "mean." The challenge triggered an informal learning episode that transformed her frame of reference as a teacher, (Table 12.3, 12.5, & 12.8).

Shiloh's informal learning process is depicted in Figure 14. Initially, she bypassed phases three and four and implemented her usual teaching approach as depicted in the first series of solid arrows and boxes. With the unsatisfactory outcome, she returned to phases three and four to develop alternative teaching strategies represented by the segmented arrows. After several iterations she reinterpreted the core problem and implemented alternative strategies to address the situation. In several cases, the phases overlapped or occurred simultaneously as represented by the segmented and overlapping boxes.

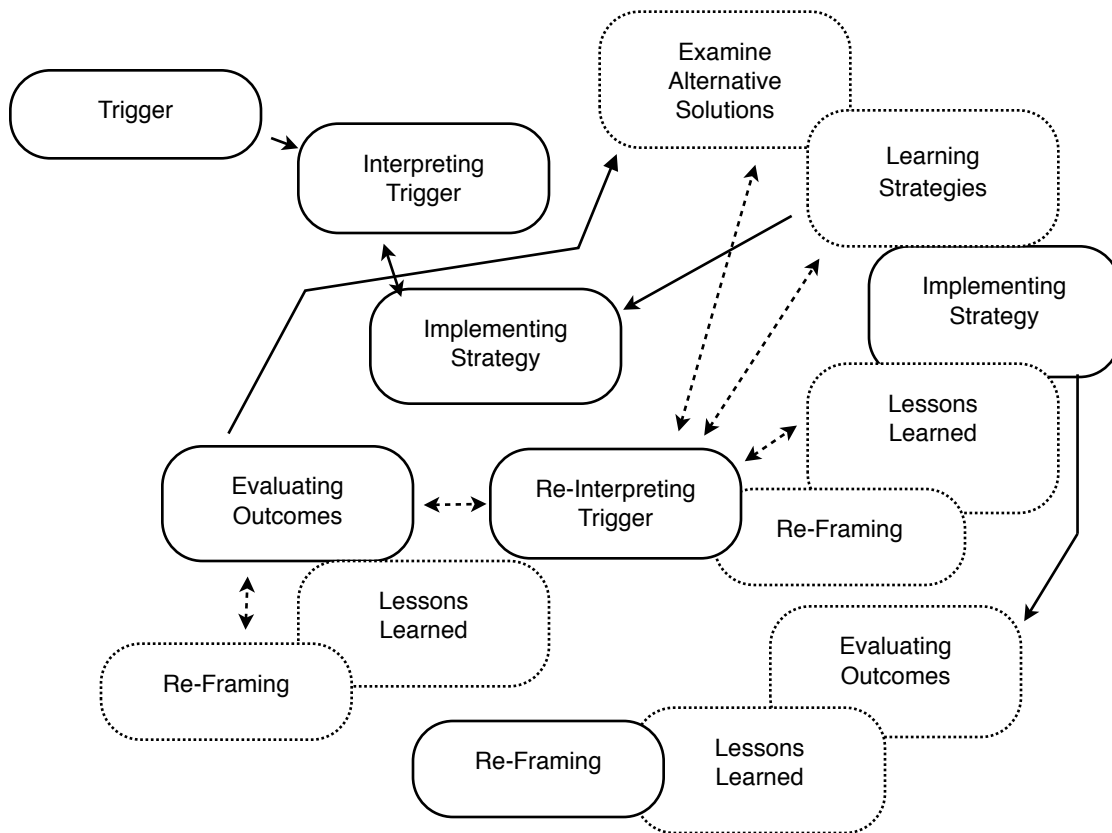


Figure 14. Informal Learning Process Map, Shiloh-1.

The next semester Shiloh was assigned students in the instrument flight training program. These students were in a more advanced part of the flight curriculum than her former students and were learning to operating the aircraft by instrument reference alone.

In the summer I had a good experience again teaching instrument students and it was my first time with instrument students, and that was totally different because they have the basic flying skills, so you're not really worried about that, but it was just totally different.

Shiloh drew from her own experience of learning to fly by instruments anticipating that her students would struggle with the same knowledge and skill development issues she had as a student. She said,

It was challenging but I actually thought, I don't know, instruments you know, when I was taking instrument courses those were probably the courses that I struggled with the most. Like there were a lot of things that at the time that I

didn't understand, maybe that perhaps I should have understood, and now, when I'm teaching them, and I'm thinking about I remember that and it was so hard you know. I try to think about what I didn't know that I should have known and make sure that I taught that to my students.

Her difficulties in this process of learning to fly by instruments had fostered expectations of what she might expect from her students. Through the struggle of learning as a student, Shiloh had developed strategies that she found to be useful in developing her own understanding. She now employed these as she taught her own students indicating,

one of my students struggled a little bit with holding and I know that I did as well, and really what helped me was to draw it out you know. Not just take the clearance that they give you and try to figure it out but actually putting down and drawing that out. So I try to take things that were useful to me and apply it to that.

Table 13 follows Shiloh's informal learning while attempting to resolve this technical skill and knowledge problem. A holding pattern is a procedure utilized by air traffic controllers to separate instrument operated aircraft to provide a safe operational environment. The student found the procedures confusing, became disoriented, and unable to comply with the procedure (Table 13.1). Shiloh had also struggled with understanding holding patterns as a student and implemented a teaching strategy that she had learned as a means of making sense of a holding pattern clearance (Table 13.2, 13.4 & 13.5).

Table 13

*Technical Skill or Knowledge Problem, Shiloh*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Student had difficulty with holding patterns	

(continued)

Table 13 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
2. Interpreting the Experience	a. Shiloh interpreted that the basis of the knowledge problem was a lack of understanding the holding pattern clearance.	a. This interpretation was strongly influence by Shiloh's learning and strategy development as a student. She attributed to her student the probability that her student's problems were similar to the problems she experienced in learning to execute holding patterns (FEE, PCE, FOR-U).
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	a. No explicit articulation of considering other strategies. Intuitive response based on her own experience.	a. An intuitive response possibly precluded considering alternate solutions having a set of solutions previously developed (FEE, PCE, FOR-U).
4. Learning Strategies	a. The teaching strategies that Shiloh employed were informally learned through her own training as a student.	a. Learning a method as a student predisposed Shiloh to utilize the same method with her students expecting that they would engage in a similar difficulty of making sense of the holding pattern clearance (FEE, FOR-U).
5. Produce Proposed Solutions or Implementation	a. Implementation of the strategy was evident in her ground instruction.	a. Implemented an approach that mirrored what had been a solution for her as a student (FEE, PCE, FOR-U).
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	a. Outcomes were successful	a. Successful outcome and resolution based on the improved performance of the student (FEE, FOR-U, FOR-F).
7. Lessons Learned	a. Reinforcement that the teaching strategy was suitable for developing a student's understanding of holding patterns.	a. Satisfactory results indicated that the method was sound (FEE, WE, FOR-F).
8. Framing the Context or Reframing	No explicit articulation of reframing	This successful outcome would likely strengthen the expectation that the method was a suitable approach to teaching holding patterns (WE, FOR-F).

The student's skill and knowledge was improved and the positive outcome reinforced her expectations that this was a suitable method of teaching holding patterns to her future students

(Table 13.7 & 13.8). In this case, her hypothesis that her learning difficulties and the strategies utilized to resolve the difficulties would be the same for her student had resulted in a successful outcome (Table 13.6).

Shiloh's informal learning process was direct path from trigger to implementation as depicted in the Figure 15. She bypassed phases three and four implementing a teaching strategy that had been the result of her own learning as a student. The positive outcome tacitly reinforced her frame of reference of the approach as represented by the segmented boxes of Evaluating Outcomes, Lessons Learned and Re-framing.

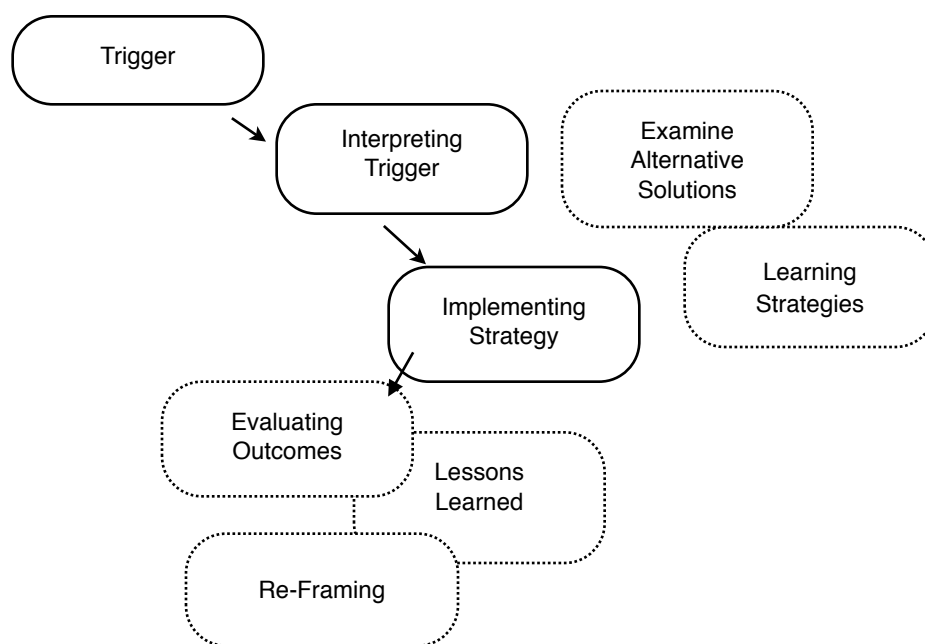


Figure 15. Informal Learning Process Map, Shiloh-2.

For Shiloh, being a flight instructor was much like when she taught dance. She provided guidance, correction, and critique for her flight students as she had her dance students. She indicated that the most difficult problems to deal with were those that were social interaction problems involving inappropriate behavior, motivation, or attitudes. Being a good teacher meant breaking down into parts a complex task, as she had done for her youthful students, and



maintaining a positive relationship, as she had in her social relationships. Her learning had come through experience, experiment, collaboration, and innovation.

It was just trying to figure out what was happening to the students why they weren't getting to that next level you know. You really had to look to see what was going on and really tried to have to figure out why they were doing those things that they were doing, and then you had to come up with about ten different ways to explain what they should be doing because a lot of time they didn't catch on right a way.

As a part of her learning in the early days of being a teacher, she found the need to be creative and flexible in her approaches to a subject. She explained, "...I think for me what I try to do to be a good teacher is that I try to show my students that I...you know care. I want them to see that this is not just a job for me but that I am interested in helping them..." Shiloh described her place as a coach, guide, and as one who provided support. She linked her identity as a teacher to her mother and other teachers she had been influenced by in developing her frame of reference. However, she continued to change, develop, and adapt through informal learning, transforming her frame of reference as a part of a dynamic process. "I don't want to be that mean person. I don't want to you know, make them upset. But, you kind of have to at some time, so I learned to be just a little more forceful about it and more serious and just make your point clear" As she continued to change, learn, and develop, additional threads passed through her experiential tapestry.

### **Lisa**

Lisa was from a suburban setting in the Midwest near one of the major cities in the region. She was the older of two children in a close family network that included her grandparents, aunts, uncles, and cousins all living in the same general area. Her mother was a stay at home Mom until Lisa was about sixteen when her parents divorced. Her mother was at

home except for some part time employment was particularly important during her childhood as her father traveled extensively. After her divorce, Lisa's Mother returned to work for the same company she had worked for from high school until Lisa had been born. While in the company, she had been promoted to an executive secretary position. Lisa remarked that she had a close relationship with her mother, particularly after her parents separated. Her mother was always willing to help, always looking on the bright side of a situation, she had adopted this characteristics and this outlook from her mother.

She "counted herself lucky" having her mother at home, always available to her and her brother. This situation fostered a close family relationship expressed by having family dinner together daily, watching movies together, and having family support for activities that she and her brother were involved in.

I played softball until until I left for college. So my family came to my softball games. My dad was a coach for me...he was also a coach for my brother who played baseball and football. So we just did sports and activities and vacations and things like that together.

Lisa indicated her involvement in softball had influenced her development. She had started playing softball when she was five years old and, "...played competitively all the way up until the summer before I came to college..." Softball had provided not only family engagement and support but an extensive social network for Lisa. She developed close relationships with the girls on the team and later, she coached and assisted younger girls in softball, developing a relationship with the younger girls that she coached.

The summer before entering college she was injured while playing softball. Despite the fact that she had been recruited by several schools to play softball, she found that she could not continue to play competitive softball. With the loss of athletic scholarship she determined that

the expense was too great to attend an out of state school and decided to attend an in state college instead.

So I had applied on a whim to the [state university]...well it's a really nice school you know really good academically so I kind of wanted to save money, so I'll just go there...and I was good at history in high school...so I'll just do history and maybe become a teacher and coach softball.

Reflectively, she considered her injury and this change in schools to be a "blessing in disguise," in her characteristic positive framework. Along with the change in schools, the injury required a change in academic direction as well.

I was like, I like history a lot but, you know I don't think I could sit and teach kids...in a high school...like all day long. The kids in my high school were just terrible, terrible kids...like if something didn't go their way...like they didn't get a good grade or anything...they always blamed it on the teacher and mommy and daddy always called like, "why did my son or daughter get this grade?" Not everyone, but in a lot of classes there were a lot of people who were like that and they would always, always, it was never their fault, they disrupted class, you know make fun of everyone, you know I don't think be in that setting.

During her freshman year she had come into contact with the possibility of aviation through some students in her dorm that were in the aviation program at the university. Having an interest in traveling, she investigated the university aviation program and thought that she might be like aviation. She contacted the academic advisor for the program and arranged to start flying in the summer of her freshman year.

Until that spring she had not known anything about aviation or the university aviation program. Beginning the aviation program was a refreshing experience for her.

Becoming a pilot and being in the [aviation program] made me feel so much more confident in myself...It takes a lot of work to get all your ratings here and it's such a small amount of people in the [program] that you can build fantastic friends and actually in the field, its just so little people that you get to know a lot of people and really like that...I like engaging and interacting with other people...like on a small basis where people know each other.

As a large part of her learning in the aviation program Lisa highlighted her informal learning about the field of aviation, various careers in aviation, and the curriculum pitfalls, and opportunities through the student organizations and personal friendships which she cultivated as a student. Her characteristic investment in social engagement provided her learning beyond the instructional setting in much the same way that she had learned in softball. One aspect of aviation that was gleaned from these social encounters was knowledge about building flight time inexpensively through teaching in the aviation field.

**Becoming a teacher.** Similar to her goals of becoming a history teacher and softball coach, Lisa envisioned herself positively as an instructor as characteristic of her desire to help others as she had been helped as a part of her learning experience.

I think for me it was just sort of the natural progression of the program...like ... well I'm going to be flight instructor so...and then I realized that I didn't have to do that, but I really wanted to because I really enjoyed flying and thought maybe that I could teach kids to really enjoy flying as well.

She correlated her activity as a coach to her expectations and experience as a flight instructor,

I see them as really, really similar...When I coached softball...I knew so much about softball and liked it so much I just wanted to share my knowledge with people...so...I tried a lot, I just wanted, these are little kids too...from ages like six all the way up the like the age of 17. I just wanted to get on a level that they were going to understand me, and they wouldn't get confused...So that was always a challenge but it was fun...So we would just go through it doing things they could understand, and in the end it was really rewarding seeing actual change in how they did things.

Lisa said except for two instructors, she had good instructors in the aviation program. Her second instructor in the aviation program greatly influenced her approach to flying as well as teaching in aviation. She said, "...so Ron taught me to pick references...and he taught me to bank correctly...so he actually taught me the components of the maneuver...in stead of just turning

around the point..." She correlated this to what she had learned and taught as a softball player and coach. Additionally, she said that "good" instructors "made flying fun."

In contrast, the instructors that she considered bad "...made you feel terrible about yourself..." For Lisa, the outcome of such a learning environment was to "...want to give up and quit flying..." Such instructional techniques shattered her confidence.

They would say, "you suck, I can't believe that you fly like this you should have never gotten your instrument rating. You should have never gotten your private pilot's license, I can't believe that you got to this course, you know how can you call that a landing?"...and that's terrible and I don't know why you would do that, and that's not how I would ever teach and that's...because that does not build my confidence up that makes me feel terrible...because in a flight instructor I'm looking for him to help me build my confidence in that new...ah, in that course.

Lisa said that this was similar to the way her father had been as a coach.

He'd be like, "oh I can't believe you're doing that"...and I always hated that...I still hate it. I can't stand it; it drives me crazy. So when I had it in a flight instructor I was like, "...oh, not this again, seriously..." But even though I dealt with it as a kid I still...I still can't get myself to, to get what they say to not, not listen to what they say...to focus on what I'm trying to do.

Other instructors were more like her hitting coach.

He was really relaxed about teaching...he was giving credit where credit was due...instead of never giving credit at all, and just making me feel like I could not do it...and he just made it fun...Like one time I had a really good power off 180 [power of landing requiring a 180 degree turn] and he's like, "like give me a high five," in the plane and things like that. It was just awesome doing things like that, doing things that are not strictly related to flying things that are not related to business...It was really, really fun...Actually just having a good relationship with your student and that's what I try to do.

Lisa's experience as a student and participant in softball formed her frame of reference for teaching. Her experience coaching and teaching had taught her the need for flexibility and variety in approaches because "students were not all the same." She had formed concepts about

teaching through coaching such as a need to break down complex tasks, the importance of repetition, and the value of developing a positive relationship with her students. She remarked that a teacher needs to “teach all the knowledge,” as she had in teaching hitting a ball so she saw the need in teaching the various task of flying.

So these little kids would be so focused on not dropping the shoulder, squishing the bug thing like that and they would focus on that and they would not focus on just swinging the bat, so I’d stop them and I’d break it down for them really easily just really simple. Simple things to do and then I would see that they would just get it better.

Coaching, along with the influence of her teachers both good and bad, had formed a frame of reference for her as a flight instructor. However, she would not approach instructing as "intense" or as "harsh" as some of her instructors had. She thought that one needed understanding in a broader context as a teacher, focusing on the positive aspects, and to instill confidence in the student.

I like to compare flying to playing sports some times just because everyone got those days where you’re just off. You don’t know why, you think that your mentally engaged but something’s just not there. I don’t know if it’s the muscle memory or what, it’s just not there its just not working out...So I kind of think that’s the same for flying.

Lisa's strong influence of social engagement with her immediate and extended family, softball team mates, and peer associations through student organizations, reinforced the importance of building strong positive relationships with her students as a teacher. Further, she held that strengthening a student’s confidence, as well as her own confidence, was a critical factor in a good learning environment. She said, “...to help me build my confidence with teaching, definitely before every flight period, I spend about an hour...kind of making sure that I have exactly what I’m going to be teaching and know the flow of what we’re going to do either

on the ground or in the airplane...” As a teacher she said, “...its like at that [basic] level you're trying to build [their] confidence you're trying to build their excitement for flying, and I think that you kind of have to nurture that and help with that and help them grow with that...” In the spirit of this approach Lisa styled herself as her students' “personal cheer leader.”

**Informal learning and problem profile.** During her early teaching experience Lisa faced a problem that required her to learn her way through the situation to facilitate the student's learning illustrating her identity of being a nurturing teacher.

I had last summer or I guess this past summer...we were doing landings, and he really wasn't getting them down again...He had a couple that weren't that good and I could have sat there and I could have been like “...oh, that sucks, this sucks, this sucks, you need to do this...” you know, you could do this, this, and this”...I can remember being on downwind and like...I have to get his confidence up and I have to get his mood up 'cus right now, I can tell, I could tell that he was about to slip into that mood where he's over focusing and freaks out and things like that.

Lisa began with her usual approach to dealing with the student's technical skill problems through coaching and practice (Table 14.1 & 14.5). However, the student's response to her intervention illuminated an additional complication to the problem. Lisa's experience in softball provided an alternative interpretation of the situation (Table 14.2), and suggested a strategy which she implemented intuitively (Table 14.5). She related that, as when coaching in softball, she had seen players become too focused on one aspect that they fail to be successful until she was able help them refocus (Table 14.2, 14.4 & 14.5). This became a model that provided an approach to help her student to progress (Table 14.6).

Table 14

*Social Interaction Problem, Lisa*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Problem landing the airplane	Based on established criteria.
2. Interpreting the Experience	a. Based on her experience as an instructor and as a student b. She re-interpreted the problem as a self defeating preoccupation issue that impeded progress.	a. She used criteria according to the curriculum on the initial interpretation (FEE, FOR-U). b. With the failed implementation of the her usual methods she reinterpreted the situation and utilized her experience coaching and interacting (IEE, SOC, FOR-U) c.
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	a. No explicit articulation of this phase.	a. Implicitly she by passed this phase and moved to the implementation phase. The approach she used was a derivative of her experience outside of aviation (IEE, FOR-U).
4. Learning Strategies	a. No explicit articulation of this phase.	a. Used the usual approach implicitly gained in her formal education (FEE, FOR-U). b. Lisa attributed learning of her approach as transferred from coaching softball (IEE, WE, FOR-U).
5. Produce Proposed Solutions or Implementation	a. Utilized usual teaching approach on the initial implementation. b. After identifying the complication of the self defeating issue she transferred a teaching approach from her experience of coaching softball.	a. Lisa used her usual approach at first (FEE, FOR-U). b. With the failure of the usual approach and re-interpretation she employed an intuitive response that was transferred from her frame of reference of acting in a supportive role (M, SOC, FEE, IEE, FOR-U).
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	a. No explicit articulation of this phase.	a. Identified continued poor performance (FEE).
7. Lessons Learned	a. Not explicitly articulated. b. Recognized the student need and identified the success of the support for the student.	a. It appears that implicitly Lisa learned that the usual approach was inadequate for this particular student (WE, SOC). b. The success of her transferred approach reinforced the role of supporter of her students through the successful outcome (WE, FOR-F).

(continued)



Table 14 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
8. Framing the Context or Reframing	a. No explicit articulation of this phase.	a. Initial difficulty illuminated the need to be versatile (WE, FEE, FOR-F). b. Implicitly strengthened her frame of references on her responsibility (WE, FOR-F).

Lisa's process of informal learning is depicted in Figure 16. Her experience as a student and new instructor led to bypassing of phases three and four to implement a usual strategy as depicted by the solid arrows and boxes. The recognition of unsatisfactory outcome incited her to reinterpret the situation returning to phases three and four to develop a new approach as depicted by the segmented arrows. Though requiring several iterations in which Lisa moved from implementation, to evaluation, to developing other teaching strategies, each provided informal learning, often tacitly transforming her frame of reference as depicted by the segmented boxes.

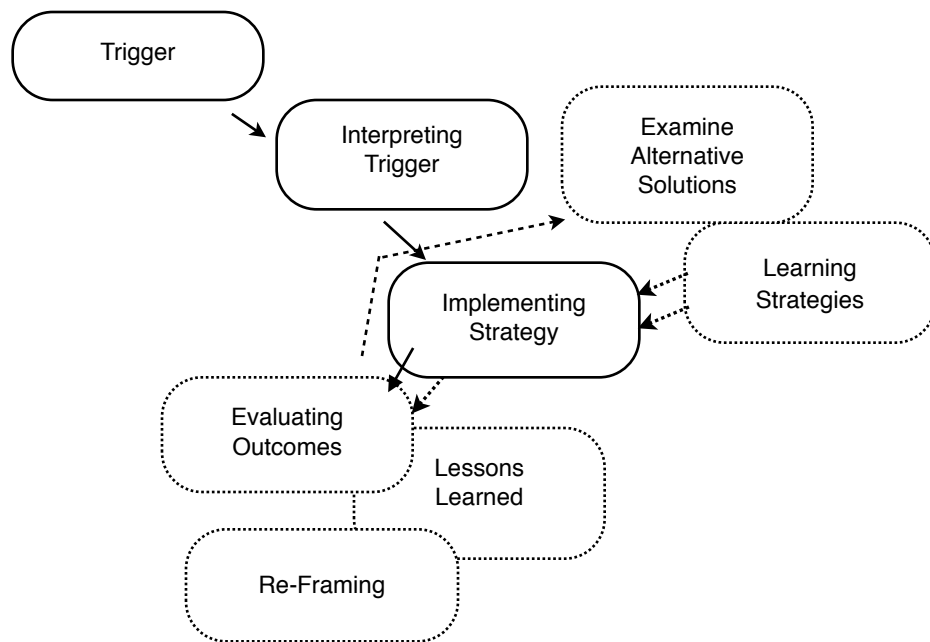


Figure 16. Informal Learning Process Map, Lisa-1.

This supportive approach was sometimes challenged in other situations and required her to learning alternative approaches to the situations. One student often contradicted her and questioned her instruction (Table 15). With her characteristic lack of confidence she said,

My [student pilot] this summer, some times I'd tell him something and he'd be like, "I did that." "No you did not"... At first I didn't know how to, how to approach this conflict with me...so I was like okay well...I know he did that so I kind of like had to think about it and now wait did he do that, am I right is he wrong...So I had to think about it.

Encountering this problem she first doubted and questioned herself. Then she explicitly identified the failure of the student to respond appropriately to correction (Table 15.2). In learning her way through this situation, she turned to consulting others to identify and learn an alternative approach (Table 15.3 & 15.4). Reflecting on this situation she said when she finally confronted the student (Table 15.5 & 15.8),

I told him, "look, I'm not comfortable with my name being on [the application for pilot certification], with me being the one that gave you a certificate, if you get it but not fly safely. You have to fly safely, and you have to fly in the way I tell you to fly because its safe and it's necessary, and if you can't, then I can't sign you off." So I think that kind of hit him hard.

This situation was complicated by the contradiction to her frame of reference of framing "strict measures" as contrary to being nurturing as a teacher. Informally she learned that some instructional situations required a stronger approach (Table 15.7 & 15.8). She remarked, "...I hate confrontation...I can't handle it, but if he wants to pass the course he's going to have to do the things that I ask him to do..." Nevertheless, the situation required her to learn to become more forceful as a teacher. This role conflicted with her identity as a teacher based on her experience as a student with an abusive instructor; but, until she resolved this social interaction problem little progress could be made in resolving the student's technical skill problems.

Table 15

*Social Interaction Problem, Lisa*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Operational problem with applying appropriate procedures	
2. Interpreting the Experience	a. Initially interpreted as a technical skill problem. b. Later it became evident that the problem was a social interaction problem	a. Founded on her experience and understanding of the required procedures (FEE, FOR-U). b. Recognized the inappropriate response of the student (SOC, WE, FOR-U).
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy.	a. Initially bypassed this phase b. Considered explanation of the student's response through collaboration. c. Selected direct confrontation of the student.	a. Initially bypassed this phase based of her frame of reference of the education environment (FOR-U). b. Continued to respond to the student and gave him the benefit of the doubt (SOC, FOR-U). c. Applied a more diligent observation of the student and confronted him (WE, SOC).
4. Learning Strategies	a. Not explicitly articulated. b. Learned through collaboration.	a. Initially bypassed this phase based of her frame of reference of the education environment (FOR-U). b. Careful observation based on her social acumen (SOC, FOR-U). c. Collaborated with other instructors for ideas (SOC, FOR-F).
5. Produce Proposed Solutions or Implementation	a. Intuitive response b. Observation c. Confrontation	a. Intuitively provide the student the benefit of the doubt (SOC, FOR-U). b. Corrected the student in a progressive process of intensifying the interventions (SOC, FOR-U). c. Became confrontational to address the lack of respect shown by the student (WE, SOC, FOR-F).
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	a. Implied b. Not explicitly articulated but implied in the change in response.	a. Careful observation provided evidence that the student had not complied with the procedures (SOC, FOR-U). b. Initial confrontation failed to resolve the student problem with compliance (SOC, FEE, FOR-U). c. Changed behavior and compliance indicated that the measures had been successful (FOR-F). d. Did not explicitly articulate her assessment of her personal learning.
7. Lessons Learned	Implied	Learned that in some situations she had to be more forceful (WE, FOR-F).

(continued)

Table 15 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
8. Framing the Context or Reframing	Implied	Transformation of her frame of reference to include the ability to confront students with improper behavior (WE, SOC, FOR-F).

This episode demonstrated Lisa's need to reinterpret the situation. Her informal learning process proceeded through initial implementation of an intuitive response to the student's conduct reflected by the solid arrows of Figure 17. After analyzing the situation, she reinterpreted the situation and changed her approach depicted by the segmented arrows. During this process, she indicated a change in her expectations of future teaching engagements illuminating a transformation in her frame of reference of teaching and being a teacher. Some of the phases often overlapped in this process of resolving the issues as represented by overlapping boxes. Also, the tacit level of her learning is represented by the segmented boxes in the various iterations.

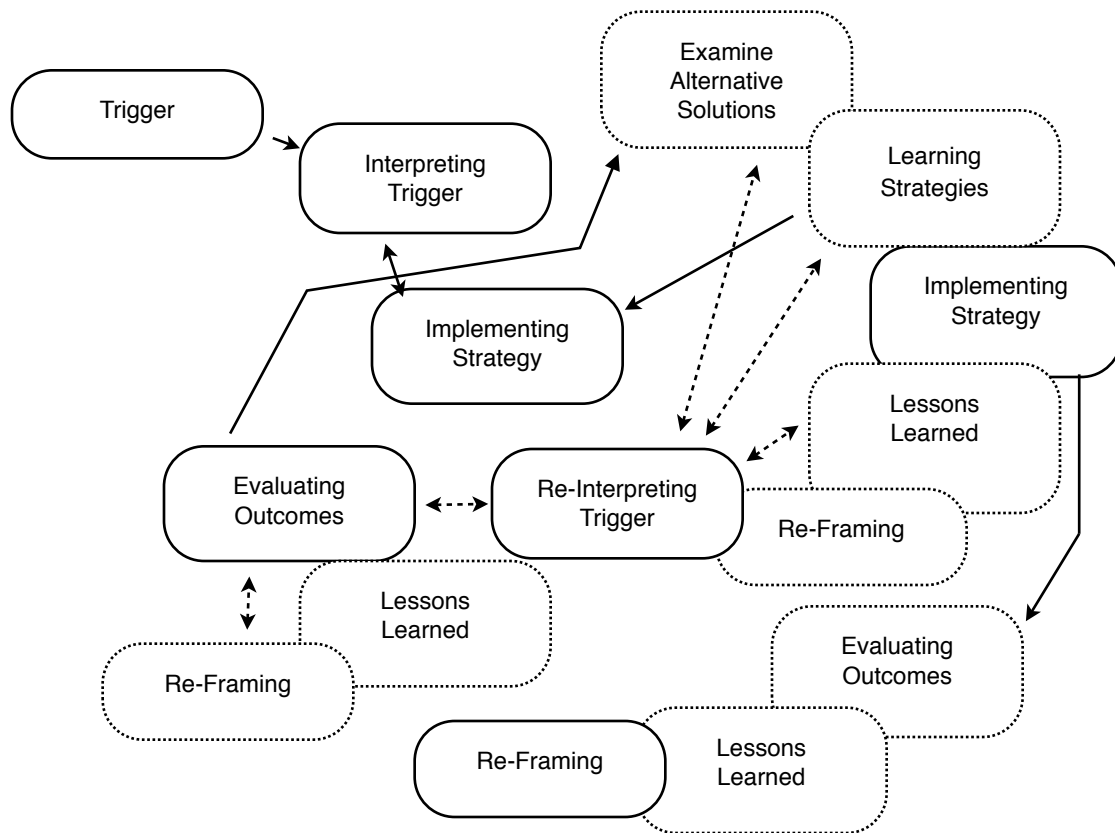


Figure 17. Informal Learning Process Map, Lisa-2.

The process of informal learning was replicated in several situations for Lisa. This was especially the case when events and situations conflicted with her frame of reference of positive social interaction and required strict measures. Implementing a necessary confrontational approach was impeded because Lisa had to get past her preconceived notions of the meaning of confrontation. However, she learned that in some instances she had to confront inappropriate student behaviors to maintain a suitable learning environment, and became more ready to use strong measures at the first indications of social interaction problems to maintain a suitable environment.

## Matthew

Matt grew up near a major midwest city as one of three children. His father, a self employed accountant, had chosen to set up an office at home early in his career both to have his

own business and to be close to his family. Matt's mother, a stay at home mom, furthered the development of a close-knit family being constantly available and involved in the daily lives of each of her children.

My earliest memories are just playing and mom waking me up and baking, cleaning, and watching TV and around the house chores and what not, but having defined roles of what you were supposed to do. So every week it was my responsibility to vacuum or do certain chores and my sister had certain chores.

Matt developed a sense of responsibility as a child in his home. His older half sister was a frequent member of the family, but was older and had little interaction in comparison to he and his younger sister. By high school age he and his sister had their own activities they were involved in; nevertheless, the routine of the family included dinner together in the evening and time set aside for vacations. As a part of this close family, he and his sister partnered in several activities together growing up.

Even with this high involvement in the family, Matt was very active outside of his home participating in basketball, baseball, and church activities.

I remember my mom told me that I was sick once in the first grade and I did all the math book that was supposed to last me the entire year because I was bored and I just needed something to do I think that I've always found myself wanting to stay busy and wanting to do well.

In high school, he wanted to play basketball, however, he didn't make the first team. The school's athletic policy allowed a student to practice with the team and if something occurred that opened a position on the team then the student could move up. Matt chose to practice with the team hopeful for a chance. He ultimately earned a position on the team due to another student becoming academically ineligible. With an interest in staying busy, he joined in a competitive speech team at the school along with playing basketball. On the speech team he

participated in several events which required him to develop a five paragraph speeches in a limited time. He remarked that this made writing papers easier in high school and college and he liked the competitive atmosphere and mental exercise. He remarked that he was motivated to “be successful and to do well” in every facet of his life. This characteristic was evident in his work in school, in the work place, in his college experience, and in his responsibilities as a teacher. Matt described what it meant to him to be successful.

Doing well getting A's performing well. Because I also saw myself do things that weren't necessarily great. For instance, so when I was in first or second grade... They had ah, they wanted you to do well they wanted you to push yourself to do well, so if you had to write your name on the board for something, you were not given this little cardboard that said that you did well for the week or whatnot. So there were a couple time when, when I didn't stand properly in line, or didn't do something right or whatnot and I saw my name get written up on the board and I didn't like to associated myself with not doing well and not receiving the awards. I don't know whether I pushed myself to not do bad, or I just found in doing my work in that if was something that was easy to do for me as a way to succeed.

Nearing the end of high school Matt developed an interest in continuing his education and began to seek a career field. He said that they often flew on family vacations when he was a child and on one of these trips he was allowed to go the cockpit and talked with the pilots. This experience formed an interest in becoming a pilot.

I came to enjoy that, that part of going to the airport, and going through all of picking up your luggage, and getting checked out, staying in a hotel, something different than being at home, and I knew that I always want to be, to get a pilot's license. But, I didn't know if that's what I wanted to do as a career.

His aunt and uncle worked as air traffic controllers and through a few of his father's contacts, Matt was able to meet and interview a few of his father's clients that were pilots.

I discovered that life isn't always the way you make it out to be, or the way that you think it will be when you set out. So some of these people had different ideas and ambitions...So I saw various different opportunities to have whatever type of

lifestyle you wanted so long as you were able to make it work for you, and I knew that aviation was something interesting for me and that I wanted to try it.

Matt was able to take a flight in a small airplane with a man from his church who was a pilot which helped him decide to fly.

His older sister had gone to the state university and his maternal grandparents lived in the area of the state university. The university became a natural choice when he found that the university had an aviation program

Matt intentionally included courses and goals beyond the flight courses and the required curriculum taking many alternative courses to broaden his understanding of his world. He also participated in several extracurricular activities, highlighting a scholastic honor society that he joined. The honor society allowed him to engage with students from across campus and broadened his understanding of others while attaining his pilot certification. This exposure influenced his frame of reference and shaped him as an instructor.

As a student in the aviation program, he wanted to be successful and worked hard to be the best he could be but was also challenged in the process.

I realized that it was a lot more physically taxing than I thought it was. I remember the first time I went flying. I remember comparing the first time I went flying here at the university to the first time I went flying in the small plane...the first time I went flying here, and I got to do the same things, but I was asked to do more and I remember that I was just wiped out...I found that to be a challenge that I wanted to push myself to be able to do [it] because this was something that I wanted to do and so I came back the next time and I tried to do more.

These characteristics framed his approach to becoming a flight instructor.

**Becoming a teacher.** Matt recognized several benefits in becoming a flight instructor and continued through flight instructor certification. First, it meant that the expense of gaining flight time could be offset by being an instructor. By federal regulation, as one instructs he or



she may record the time accumulated as an instructor as pilot in command time. This flight time is required to secure employment at the next level in the aviation industry. A second advantage he recognized was that he could continue to “take flight courses rather than being required to take more psychology courses” as a part of the alternate curriculum for the degree program. Finally, regarding his choice he indicated,

When I was younger, we were asked to, I think it was in high school, and we were asked to help out with the younger kids basketball...and I always liked showing others what I was already capable of doing. I liked teaching. So I figured that it [flight instructing] was probably another way to help other people to get to where they wanted to go because I was in that position once, and someone helped me and I would like to help someone else, and I found that teaching someone else is an opportunity to, it fills my criteria, I get free flight time, I can teach someone else...and also I don't want to take any more psychology classes.

His concern of caring about and for others had been instilled in his home, in his education, and was a key tenant of his religious beliefs and value structures. He continued to frame his responsibilities, and had enjoyed providing for others though teaching opportunities.

Having completed his certification, Matt participated in the Practice Teaching Course as a part of the undergraduate aviation program. His ability to manage his time and his focused attention to “...achieving success and doing well...” was transferred to this new domain.

Matt described his first two students as “good students.”

They showed for class on time, they were always prepared, they weren't always physically ready for what was to be performed, but they always wanted to be there. That's something that I like because I was one of those students, who if I wanted to be at something I was there. I was there whole heartedly and if I didn't want to be there well.

These students were much as he had been as a student in his evaluation. This illustrated how he based his interpretation on his experience and measured his students according to his frame of

reference. He transferred his work ethic and concern for doing well to his expectations of his students.

**Informal learning and problem profile.** Though Matt had good students the semester was not without problems. One student had unexpectedly failed on the first attempt of the final practical test at end of course. These practical test were administered by a more experienced check instructor to assure a student's proficiency prior to allowing the student to advance to the next phase of training, or receive a pilot's certificate.

I remember that I wished that there was more that I could have done to help teach them, something better and I remember talking to you in the journal that I felt like, I felt like a bad instructor because they didn't perform well. I remember the comment that you wrote back to me that they both failed in different areas, so that it wasn't something necessarily that I failed to teach them but maybe something that they just weren't able to do. I remember doing all my flights, and oral examinations, and that flights were always more difficult because, you know there is a lot of stuff that your trained to do, but there are always subtle changes between flights. So there is always something different.

The ill-structured nature of the aviation environment provided numerous variables that complicated the learning process. This had required Matt to learn various approaches to the topics in the aviation but he said, "...you get into the pattern of saying things in a certain way..." He learned that he had to try to break this pattern and that by gaining experience in different situations, with various students, in different semesters helped him to develop alternative approaches. He had also learned that having a second student in a course helped to "...break up the patterns..." that become the usual approach to teaching. A second student helped by the students collaborating with one another to develop an understanding of the material.

Matt said that one of his students, "...would focus too much on one area that wasn't perfect and wouldn't let it go to keep flying..." (Table 16). The student had performed poorly on

one of the early procedures then continued to display unsatisfactory performance in much of the remainder of the flight (Table 16.6 & 16.7). In retrospect Matt said, "...looking at his [the student's] past experiences with check rides and stage checks [practical test], I see that he got nervous with taking them and had to redo them..." He commented (Table 16.3 & 16.4).

If I could change something that I would change in my teaching is to always have something be unexpected because, especially in aviation, because if you get into a routine of doing something, then your not expecting something outside of your routine. Which I have learned in having my one student, the spring semester of last year, to always anticipate problems of things [that could] to go wrong.

Matt implemented a usual approach to addressing the needs of the student (Table 16.5). As he reflected on the student's difficulties on the practical test he contrasted the situation with an earlier experience with another student (Table 16.2). He indicated that in retrospect that he had learned that he needed to provide variation as a part of his teaching to help students to be prepared for the variation that they would face on a practical test (Table 16.7). This learning experience had enlarged his understanding of the nature of being a flight instructor and transformed his and approach to teaching (Table 16.8).

Table 16

*Social Interaction Problem, Matt*

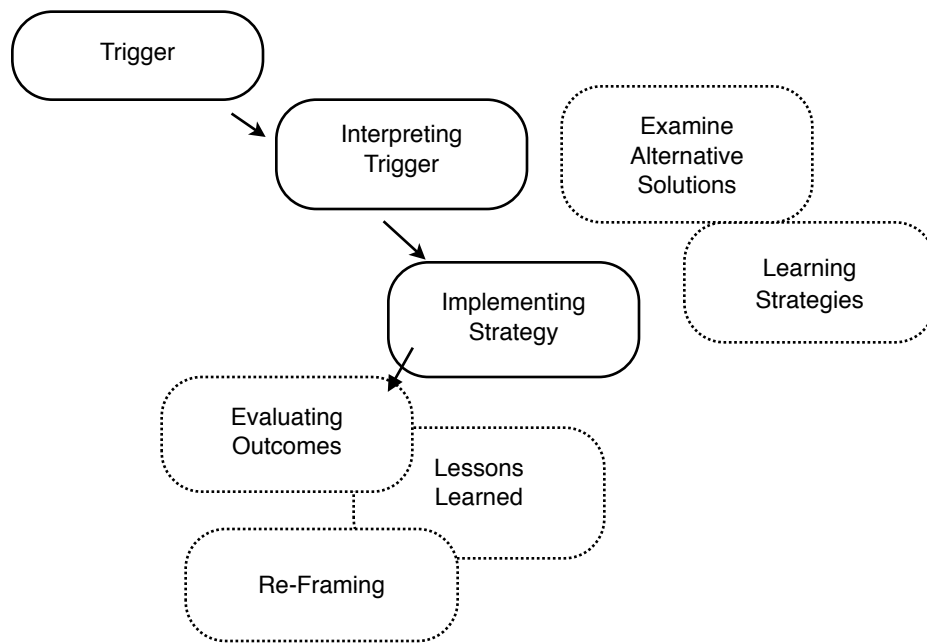
Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Failed Practical Test	
2. Interpreting the Experience	a. He interpreted the event as an indication of failure of the provision of adequate instruction	a. This interpretation was in accordance with his frame or reference that an instructor should provide the support and learning environment suited to each individual student (BVR, FEE, SOC, WE, FOR-U).

(continued)

Table 16 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy.	a. Implicitly identified the selection of a teaching strategy for future use through proposed action.	a. As an event that is contrary to his frame of reference he evaluated various methods to develop a suitable solution that would avoid a similar problem in the future (FOR-F, BVR, WE, PCE).
4. Learning Strategies	a. Not explicitly articulated but evidently deduced based on this experience.	a. It appeared that this became a process of trial and error to facilitate the varied learning environment for his students (WE, FOR-F).
5. Produce Proposed Solutions or Implementation	a. Further adjustment of his teaching methods.	a. Matt indicated the need and intention of an adjusted method for the process of teaching (WE, FOR-F).
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	a. Not explicitly articulated.	a. Matt felt a sense of responsibility with the unsuccessful practical test (FOR-U).
7. Lessons Learned	a. Include variation in the instructional process.	a. He had learned through the event to provide a varied element in the process of teaching as an extension of his frame of reference of a teacher's responsibility (BVR, FOR-F).
8. Framing the Context or Reframing	a. Adjusted frame of reference of his responsibility to provide variation in the instructional environment.	a. An adjustment of his frame of reference of teaching as he recognized and augmented methodology (BVR, WE, FOR-F).

Matt's informal learning process is depicted in Figure 18. The experience of the student's difficulty during the practical test helped him interpret the situation and devised a plan of action to implement in his further instructional activities (Table 16.2, 16.3, 16.4, & 16.7). This intention to change displayed Matt's frame of reference of taking responsibility for the student's outcomes and signified that he measured of his own success through his student's performance. This episode is unique in that it was a reflective process regarding the event that resulted in a learning transformation of his frame of reference of the meanings and methods of teaching (Table 16.8).



*Figure 18.* Informal Learning Process Map, Matt.

The influence of Matt’s frame of reference, as being responsible as a teacher, was a significant factor in this informal learning process. Situated in his value structures to do well and be successful, his reflective interpretation, critically considering his own teaching, resulted in an adjustment to his methodology, and a transformation of his frames of reference of appropriate strategies. Matt retrospectively re-framed the event, assigned altered meaning structures, and reshaped his identity and practice as an instructor.

## Ben

I grew up in small-town setting, the life is very easy going there than some other big city life, or what I think of big city, life it's very rushed. When I think of easy going...I think there's not a lot sounds, it's very quiet and peaceful at home. You don't hear a lot of traffic there's not a lot of commotion outside the people and stuff like that.

Growing up in that small town was a pleasant experience for Ben, the only child of highly involved parents and a family network. Early childhood days were spent with his grandparents, in part on the family farm, while his parents were at work. He remarked,

I mean there's a cornfield in our backyard and still I grew up [in farm country] but I didn't farm, but I'd go to, my aunt and uncle's still farm, the family farm, I think that it's in the Portt, my mom's maiden name this Portt, I think it's been in their side of the family for like a hundred years I think. So there's family farm ground. I remember my grandparents always babysat me when my parents were [working]. So they, my grandpa still farmed into his old age. So I remember spending a lot of time out there, a lot of time to ride around on the tractor and the combine.

Family filled a lot of Ben's descriptions of his early memories and experience in this rural setting. His mother and father were part of several generations that had called this area home having both been raised on farms in the area. After attending college in a neighboring state together as a married couple, they returned to the area, found work, and continued the family history in the area. His father returned to a workplace that he had been employed in during college. He gradually worked his way to a plant manager position through his diligence and dedicated performance. Ben spoke of the long and irregular hours that his father would often work in providing for his family. His mother, a graduate in physical education, took a teaching position in the local school system after college. At first, she taught in the physical education department; but when the district had a need for a science teacher she transferred to that position. The families work situation required the support their extended family for Ben's child care needs.

I did half days and I was a.m. [morning class assignment in half day setting]. So my mom would drop me off in the morning, before she went to work [at his grandmothers]. My grandma would get me ready for school, and she'd take me to school and then she'd pick me up and then I'd be with her or grandpa until my mom or my dad came and got me... Then, you know, once [I was in] first grade it was full days, school days. So my mom would take me, I'd go to school in the morning, and I'd be at school all day and then I'd just go to her classroom afterwards.

Some days he spent on the family farm with his grandfather, others he spent with his grandmother or his parents. The transition between family members and homes provided constancy in care and values, he remarked, "...you know they raised me, they treated me no different than my parents did, they had same values and stuff..." This environment contributed to his sense of being valued and loved by his parents, and it influenced his choice to remain in the area for school and work so he could be near his family.

At one point Ben had been a student in his mother's science class in the local school. In the small school she was the only science teacher. He was a good student academically, and having the teacher at home made class all that easier. Small rural schools have a unique culture.

I mean not only did you know your class you knew everyone else and all the other classes too and everyone knew you, and then you get into the little kids too that would look up to you because you were older and they know who you are. You get a lot of that too.

Ben was able to engage with many of the other children in the area, both in and out of school. Being a member of a small community allowed him to be widely known. He knew each of the 200 students in the school as well as many of the children from the surrounding area. Some of his understanding of a good educational setting had been influenced by the close informal culture of this community.

School came easy for Ben, his ability allowed him to maintain a high academic level during his pre-college education without really having to try. However, in college Ben started in a premed program. He said, "...it opened my eyes, it was like all of a sudden, like how I usually study wasn't working anymore..." Nevertheless, his willingness to work and his natural ability combined to allow acceptable performance even in the more difficult curriculum. The challenge helped him cultivate time management and persistence.

Ben was a member of his high school golf team. Though he had been involved in other sports and activities from early childhood, he seemed to have a natural ability for the game of golf. His skill was discovered by accident while playing with some of his high school classmates as they drove golf balls into the cornfield from his yard. With some training and coaching his natural talent developed.

My junior and senior year our golf team, we actually had a team. We co-oped with another town and it was fun my junior year. We won regional's, sectional we placed seventh in state, and then my senior year we got first in regional.

Ben credited his shift in focus to golf partly occurred because of issues that arose in other activities.

I ended up golfing, I picked up golf instead, and I did that in high school. I played basketball couple years in high school, and I didn't care for the coaches so. So I just like they were just, while I liked them as people, and they were teachers too, and I really liked them. But, I don't know why, when it came to playing basketball for them, I don't know they just, I don't know it just it became not fun. It stopped being fun once I got, you know I always had fun playing in them.

He had also come to recognize that golf was something that he could play as he got older and it was a sport that lent itself to his self-reliant and independent nature. This ability to act independently would play heavily in his success in the aviation program later.

Ben's early days in college were challenged by the increased academic workload, determining program direction, and facing career choices. He said, "I originally was going to do medicine, in about a year and a half I was like, I don't want to go to school for 10 years." Reflectively, he thought that his choice of medicine may have been prompted by his father's own unrealized aspirations. However, when he changed to engineering his parents supported him affirming that they had always wanted him to pursue his dreams and a suitable career field.



His experience in this community college shaped his frame of reference of a good teaching environment and identified some of the characteristics that make good teachers.

The nice thing about Sandly was the small class sizes. I mean I really loved that college. The teachers really cared, I mean they showed an interest in you, you got to know them, and they care they wanted to do well.

He noted particularly the importance of instructors that “really cared” about the well being of their students. This experience helped form his concepts of his identity later as a flight instructor.

He had selected mechanical engineering because he had always been good in math and it was also a satisfactory alternative career path from his parent’s perspective. This lessened the probability of friction at home over the change in programs. Starting this program Ben had also transferred to a four-year college that had a good engineering school. Although the new college and the area was close to his home, he said, “[I] never felt comfortable, it just never felt like home.” Hopping to resolve this problem he transferred to the state university’s reputable engineering school where some of his high school friends attended.

Two months into it [engineering program] I knew I don't want to do this I don't want to do this, and I remember, I remember going home and that was not a fun conversation with my father...He was not happy. He was, you're too old to be switching majors and you need to figure out what it is you want to do, and the main part is he never had that luxury of being able to [change curriculum].

Ben shared with some emotion, the difficult encounter with his father that this change in career paths stimulated. His father didn't have the availability of loans, but had worked and saved to go to school each semester and a change of schools or curriculum had been out of the question. He stuck with it to completion to attain a degree so he could get a job and support his family.

While in this state of transition Ben stumbled onto the aviation school housed at the university. This stimulated his interest, then with a phone call and a visit he had selected a new career path. Having made the decision to fly, he found renewed interest and invested himself wholly in attaining his aviation education and pilot certifications. With his first flight at an airport near his home he had been, "...hooked..." Learning was fun for him again and this became facet of teaching and learning as he engaged with his own students later. With rekindled interest, having made the decision to change to aviation, each weekend he went to the airport near his home to work toward his pilot's certificate while he waited for his beginning semester in the university aviation program.

Ben said he felt that he was running behind in college because of the changes in programs and he was intent on completing as quickly as possible.

I came out here the first day and Doug was supposed to be my instructor, and I had him for two days. And I mentioned to him I wanted to be a super [primary]. I was like, "I've got 30 flight hours and I want to get my pilot's license." I was like, kind of like, I was older in my head I really don't have eight semesters to devote to finishing all my flight ratings.

Ben was intent on accomplishing in one semester what was normally completed in two semesters and in two years what normally took four. This was not unreasonable as he had accumulated quite a few hours toward his Private Pilot Certification on his own. This dedication, diligence, and persistence continued to mark Ben's performance through his work both inside and outside of the university aviation program.

I wanted to get done fast. So that summer I went back home and I did my instrument training. In an entire summer, I flew a hundred flight hours...because I needed the 50 PIC [pilot in command] the cross-country hours required by [14 CFR § 61]. And then, I had to have the, I did all the simulated instrument flight hours with my flight instructor. He didn't have his CFII at the time, but he got it right before, you know, I needed the 10 hours or 15 hours. He got it right before

my last 15 hours so he signed me off for my [check ride]. And again I took my oral check ride with Dexter Bones. I had that worked out, I had coordinated with [the head of the university aviation program].

There had been a rush of rapid hiring of instructors by several regional airline companies, Ben's rapid progress through the program allowed him to assume a part time instructor position then, after graduation, he took a full time position in the aviation department. His diligence to obtain his certification through his extra efforts demonstrated his dedication to ability to accomplish a task which became an earmark of his expectations as a teacher.

**Becoming a teacher.** Ben's transitions through college included a change in fields from premed, to engineering, and finally to aviation. During these changes he traversed from a community college, to a private four-year college, then to the state university. The personal interaction and smaller class size of some of these institutions became a basis for how he framed an effective learning environment. His experience with teachers, both in and outside of aviation also had shaped his concepts of effective teaching. Ben had a particular teacher that required high standards but provided critical feedback. This provided an unparalleled learning environment that marked his framing of teaching.

She always told us if you go to Sandly [college] and you get the opportunity take classes from, oh, what was his name? Dr. Brown, and she's like, take classes from him, for some reason he likes it here and he stays here. She goes, "he could be doing so much better teaching somewhere else, but here he is," a little hole in the wall community college and he was, he was a fantastic teacher, fantastic teacher.

For Ben the high standards and being aggressive in compelling her students to excel showed her zeal for high quality education and was a strong positive influence in the development of his frame of reference of teaching. He had never shied away from difficulty and

relished a challenge. It became evident that he believed he should interact with his own students in the same way. He was also influenced by his flight instructors.

I remember the first couple of flights with Tom. God he was yelling at me. You're not doing, this, you're not doing this, you're not doing this. 'Cus [because] he was expecting me to be, you know, a [university aviation program] student. And I mean I was, but I wasn't. I had both, both sides of it. And the first couple of flights with Tom was rough. I did not like Tom at first, I mean, but looking back on it, it was good for me, he was tough on me. And it made me a better pilot in the long run, but I mean he was tough on me.

Experiencing the personal attention in the rural school system and community college influenced his approach to his students.

That's one thing about aviation you kind of become close with your students. You get to know them. Yeah, that's something I notice any student that I have gotten to know them and I kind of get to pick up on how they are and where they're from, I tried to develop a bond, tried to up a little bit with my students. So that it's not just strictly business, I want them to enjoy [flying] too, because flying should be fun.

Ben's frame of reference of being a teacher included high standards, focused attention, and strong relationships which shaped expectations of the instructional environment as well as his responsibilities as an instructor. Ben was challenged by situations which required him to informally learn new skills, procedures, and methods to understand and address the situations during his early experience of instructing.

**Informal learning and problem profile.** While in his time at the private college Ben participated in an internship that he found particularly satisfying while struggling with the curriculum and setting of the college. He remarked,

I was good at it, I was good at building things, and I'm good at problem solving and stuff like that. I just didn't like, just really didn't like the school aspect of it. It's just, really I don't know, it was just like a weight on my shoulders, and just kept on dragging me down it felt like.

Having struggled with such issues influenced his understanding of his students as a teacher and was a key factor with one particular student that faced similar problems in the aviation program. The student had some difficulty with successfully completing her Private Pilot Certification course. She had been extended in the remedial program and had become his student during his first year as a teacher (Table 17). Reflectively, he remarked, “[this student], had a bad attitude...” (Table 17.2).

She was one of those people, like it was always out to get her. She was always down about everything you know, things never went right, they were always wrong, very pessimistic person. I'm not that way at all. So I mean it was almost; it was a little depressing for me to be around someone like that you know. And trying to get her to see, she would want like perfect flights like every flight, and it just doesn't happen, it's very hard for that in [primary flight]. Trying to get her to see some good in something negative was impossible, absolutely impossible.

Ben found that this problem “attitude” impeded the student’s progress in the development of the necessary skills and confidence to attain the standards of the program though he tried various approaches (Table 17.3, 17.4, 17.5 & 17.6).

I tried, I mean, I mean every chance I got [to provide positive encouragement]. I probably took a little bit different approach to her than other students. I probably, I'm easy to get along with but, when were in that plane, I'm kind of a different person. That's a job, and I want you to fly well you know. I want you to do well, and I might be, I'm probably a little bit harder on you in the airplane you know in doing so, and with her I couldn't be that way.

One event that was required in this phase of the program was for students to conduct several cross-country flights solo. Although he felt that she had all the skills necessary to commence this phase of her training, unlike his experience and expectations, she was hesitant (Table 17.1, & 17.2).

I had no doubt that she could get from point to point and get back. Oh man, when I, when I told her when we got done with that [dual cross-country] so I told her you're ready to go. You should've seen the look on her face [it] was like she saw a

ghost, she's like, “really?” She was like, that's scary. She was scared, she was scared to go on solo cross countries.

Though not uncommon to have students express some anxiety with setting off on their own, this was unusual (Table 17.6). After extensive reassurance she completed her first, second, and third cross countries, building personal confidence with each one. Ben indicated that by the end of the term the student had completed the requirements for the course. However, on the end of course practical test she experienced extreme difficulty.

We finish the semester, but she bombed her oral bad...I, mean cause you know, I had had enough, I had, had enough primary students that I knew what stuff, I knew what stuff was covered, and what they needed to work on. And I had some you know, I had one fail a certain area, so I knew like okay I know that they usually ask about this. So I tailored their studies to what they needed to know. Because I typically knew the questions they were going to be asked. And oh, I didn't think she was, I mean she could answer questions to me. But, when it came to taking the test she just [couldn't do it] and we both she even agreed, we both agreed that she didn't want to take her recheck.

As he reflected on this episode he remarked,

I don't know if she ended up finishing. She was another one then, she transferred to another school... That was another thing that she had, she did not like here. That was part of her problem with being pessimistic and negative all the time, and she didn't like it here.

His past experience with a similar problem, of being in a school and curriculum that he didn't like, influenced his understanding the situation (Table 17.8). Though he assured, encouraged, and worked patiently with her; her progress and success in the course was impeded. He was caught in the tension formed by the need to continue to work toward the objective of the curriculum; while, he realized that the student's dissatisfaction with the field and the setting impeded the student's progress and provided deeply emotional distress for her (Table 17.6 & 17.7). Ben said, “there were times when she just needed to vent or simply broke down” from her

dissatisfaction. Ben demonstrated the influence of his frame of reference on his informal learning in persisting in the face of such a situation based on the empathetic position of a caring teacher in this complex ill-structured situation seeking help from others (Table 17.3, 17.4 & 17.5).

Table 17

*Social Interaction Problem, Ben*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Repeated remedial assignment in the curriculum and poor technical skill development.	
2. Interpreting the Experience	<ul style="list-style-type: none"> <li>a. Instructor –student relationship problem.</li> <li>b. Confidence problem</li> <li>c. Dissatisfaction with school location and program.</li> </ul>	<ul style="list-style-type: none"> <li>a. He interpreted the situation from the beginning based on his belief and experience that the student and instructor may have had deferring styles (BVR).</li> <li>b. His early interpretation is modified based on demonstrated difficulties with confidence and a recognition of a deeper social interaction issue he identified as a bad attitude (BVR, SOC, FOR-U).</li> <li>c. Later he considered the attitude problem was based on her dissatisfaction with the curriculum, the school, and her desire to be elsewhere. This appeared to be a retrospective interpretation which possibly had been tacit until confronted in the interview (FEE, BVR, FOR-F).</li> </ul>

(continued)

Table 17 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	<ul style="list-style-type: none"> <li>a. Initially bypassed this phase and moved to implementation.</li> <li>b. Collaboration.</li> <li>c. Not explicitly articulated.</li> </ul>	<ul style="list-style-type: none"> <li>a. It seemed that Ben relied on an intuitive approach to the student based on his experience with others that he considered of a similar temperament (BVR, PCE, FOR-U).</li> <li>b. He participated in a trial and error strategy selecting and learning in the process through experimentation (BVR, SOC, FOR-U).</li> <li>c. Tacitly held strategies to mitigate the adverse conditions of the student's attitude. This culminated in the termination of the flight program (FEE, BVR, FOR-F).</li> </ul>
4. Learning Strategies	<ul style="list-style-type: none"> <li>a. Initially bypassed this phase implemented a usual but modified strategy.</li> <li>b. Indicated that he used collaboration to develop an understanding of the situation.</li> <li>c. Not explicitly stated.</li> </ul>	<ul style="list-style-type: none"> <li>a. He inquired of her prior instructor to learning about this new student (FOR-U). Through the implications that he learned from her prior instructor he formulated a strategy to address the needs of his student and proceeded by trial and error (FEE, SOC, FOR-U).</li> <li>b. - c. His interpretation that her attitude is the outcome of her dissatisfaction allows him to reflect on his own experience which influenced his response (FEE, PCE, BVR, FOR-U).</li> </ul>
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Approached the student with a modification of his usual approach based on the information gleaned from her former instructor.</li> <li>b. Provided encouragement and positive reinforcement to bolster her confidence. He indicated that he was particularly careful in his feedback to her.</li> <li>c. Terminated the flight program.</li> </ul>	<ul style="list-style-type: none"> <li>a. Equipped with knowledge from her former instructor he altered his usual approach to the student based on his experience with others of a similar disposition (PCE, FOR-U).</li> <li>b. Provided encouragement to combat her negativity (SOC, FOR-U).</li> <li>c. Finally, he and the student determine after a failed attempt at the practical test to forgo further work to allow her to just go home (PCE, FOR-U).</li> </ul>

(continued)



Table 17 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	a. - b. Behavior and attitude evaluated to determine the effect of an approach as satisfactory or unsatisfactory. c. Negative affective response	a. - b. He indicated that he was able to develop and understanding of the outcome of his interventions based on his understanding of her facial and body expressions (SOC, FOR-U). c. Additionally, the students verbalization of her concerns and dissatisfaction with the university (PCE, FEE, BVR, SOC).
7. Lessons Learned	a.- b. Not explicitly stated. c. Identified the problems of such social interaction problems. Much of Ben's learning may have been tacit in this episode.	a.- b. Indicated the difficulty that a student with such an attitude poses (SOC, FOR-U). c. Reflectively indicated that her problem and response was much like his at one time during college (PCE, FEE, SOC, BVR, FOR-F).
8. Framing the Context or Reframing	Not explicitly articulated.	He indicated that he had learned in the early part of his teaching about dealing with the social aspects of his student. Implicitly he indexed the transformation of his frame of reference and expectations of his students (WE, FOR-F).

Looking back at this situation during the interview process stimulated an evaluation of the experience which attributed the source of the problems to be the attitude of the student. Specifically, that the student was not motivated because she wanted to be elsewhere (Table 17.7 & 17.8). In dealing with this situation he recognized that he had to rely on a social acumen which he suggested he had learned through dealing with other like her in the past (Table 17.3, 17.4, & 17.5).

Ben's informal learning process is depicted in Figure 19. This follows the complex social issues of his student as Ben strived to resolve the technical skill problems of the student with his usual teaching approach indicated by the solid arrows. When this failed to provide a positive outcome he regressed to assessing and implementing other teaching strategies indicated by the

segmented arrows. After several iterations, he recognized the student's motivational deficit but still continued to work toward the satisfactory completion of the course pressed by his supervisor. Through this process the phases of the informal learning process were interwoven and overlapped as indicated by the overlapping boxes. To give expression to the permeable boundaries of the phases they are displayed by segmented boxes. After the student failed the practical test and declared she just wanted to go home, they agreed to terminate the course work. She transferred to another institution, much as he had done earlier in his college experience.

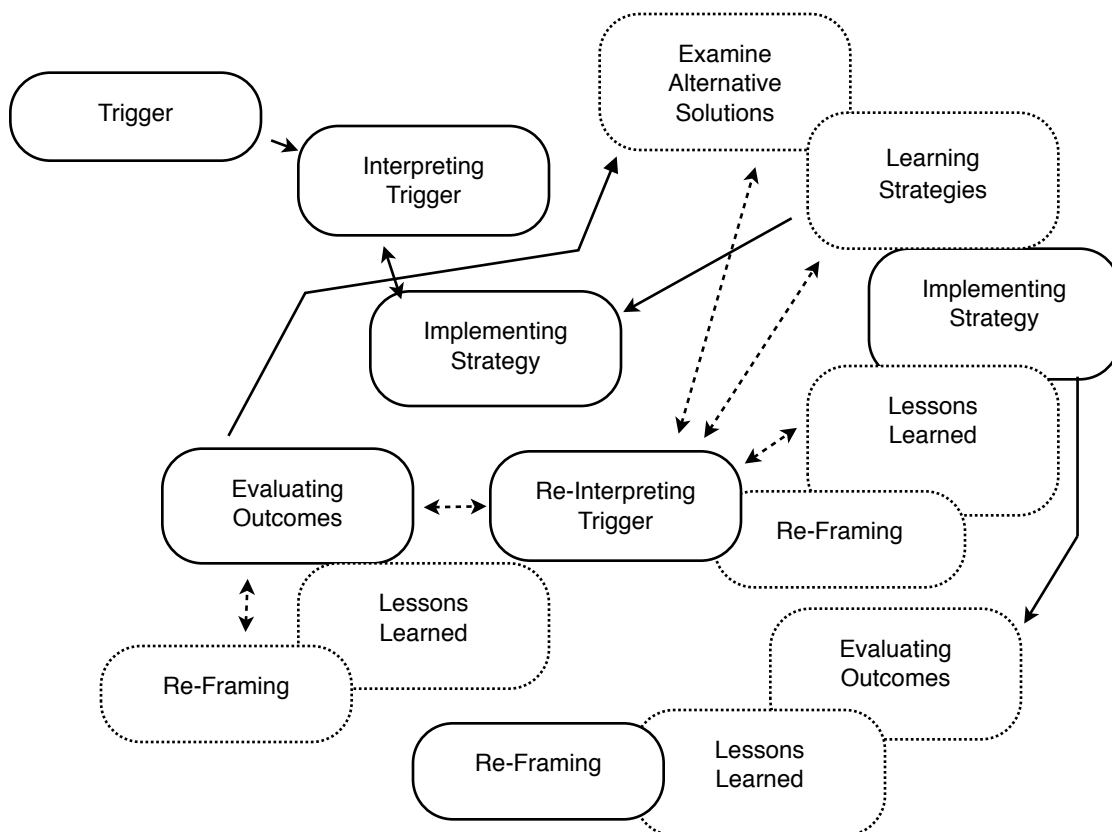


Figure 19. Informal Learning Process Map, Ben.

Ben reinterpreted the presenting problem to recognize the root of the student's technical problem was the social interaction problem of low motivation. This added to the complexity of the situation making it difficult to understand, except through the lens of his own social

experience. Ben framed the situation as being like his own experience of being in a school and program that he was dissatisfied with wanting to do something else; thus, illuminating the importance of his experience in fostering and transforming his frame of reference (Table 17.8).

### **Katherine**

Katherine was one of two children raised in metropolitan area in a neighboring state. She had known times of adversity in her child and adolescent years. While in grade school her parents divorced, friends had their homes “taken away” through eminent domain, and she endured the hardship of her mother’s struggle with a mental illness that complicated her life. Her mother’s illness had compelled her to act as primary caregiver for her at one time, and the disease continued to complicate her relationship with her mother. Her father stood as a mainstay for her and her brother during their adolescence. He was active in her school activities as a child and adolescent and continued to show an interest now in her young adulthood adventures and pursuits. Her experience with her parents, although she mentioned their professions, was more about the meaning of their relationship to her as a parallel story interwoven in her life.

As a child, Katherine was involved in very few activities. “I hung out with the group of kids that wasn’t involved in stuff and so I was never involved. I don’t know they just made a big difference like, oh that’s not cool.” The social structure and implicit norm of this group entailed lack of involvement in extra curricular activities, the general activities of school, after school sports, and clubs.

I didn’t play a lot of sports. I didn’t, I guess middle school and below, I really wasn’t involved. I didn’t like school, it was just I had to go. But then in high school I realized it would be a lot more fun if I got involved, and I joined every club imaginable, computer club, volunteer club, astronomy club, joined everything.

She came from “the not nice part of...” in her home city, many of her friends “...lost their homes...” to eminent domain. “I didn't know what eminent domain was before that. I was in high school when it happened, but it was pretty terrible. I'm not a big fan of eminent domain it is kind of crazy...” This became a key turning point of her interest in political issues and generated more active involvement in social justice and responsibility issues.

Even though she didn't care for school, it was important to her. Though she styled herself and her friends as not being involved, she was “...always the good kid out of this group...school was not hard...I got good grades; I just wasn't involved.” This changed in her junior year of high school. Most of the group that Katherine associated with were a grade or two ahead of her in school. As she reached her junior year she was faced with two situations. First, the network of friends that she had participated with had graduated leaving her alone in the high school social structure. Second,

They sent around on this piece of paper and said, “write down all your extra curricular activities. This will help you when you're building your resume for college,” or something like that, and I had nothing to write down, and I thought this is really bad. Like I wasn't going to get into a good school I wanted to you know, to do stuff.

This startling discovery generated a new phase and direction for Katherine as she began to become involved. It was a period of extensive activity generated through involvement in various school sponsored clubs and athletics.

I became the secretary for student council after being on it for a semester. I was in a leadership position in almost every club. I just decided to join everything, in the computer club I was the secretary because I was the only girl there.

Her desire to build an activity history that would position her for entrance to “a good school,” unveiled her dormant leadership and organization skills.

Katherine's social capability and natural development of relationships, regardless of an individual's background, or perceived place was evident in her relationships with her colleagues and students later.

I kind of always had friends that, I wasn't ever in a clique. I was kind of just friends with different people in all kinds of cliques. So [I was] friends with the nerdy people, I was friends with the popular people and they're were very defined cliques but, I just really wasn't part of one.

Further, the leadership and organizational skills which were surfaced and developed in this period became an asset that was utilized during her college and early instructor experience.

Her mother's illness was a significant aspect of her life when core mental health problems surfaced, during her later part of high school, continuing to complicate her life into adult hood. "My mom has a lot of problems, a lot of medical problems, a lot of mental problems." One particularly traumatic episode became the marker of her recognition of the severity of her mother's condition in which Katherine had to assume responsibility for the care of her mother. "When something went wrong I had to figure out what happened, so that she could get the correct medicine..." There were teachers who supported her.

Going back to the teachers that I like. It was because they were caring. When I was having problems with my mom, my fifth grade teacher was really there for me, and not learning math or learning science but, there for me when my mom was having problems. My best friend was trying to commit suicide and lots of stuff going on, and my teacher, um, kind of helped me out and was very involved.

Such experiences shaped her frame of reference of the meaning of being a teacher, "...you know, I kind of see a teacher is someone who cares a whole lot..." She framed that caring beyond the narrow confines of school and academic life and she used this framework as a prompt to her understanding and actions. "I show that I care, that I'm interested in the students and I

guess that I like to do that because that's what I liked in teachers that I had, and so I try to emulate the things that I liked in the teachers that I had that I liked."

Katherine's later years in high school were a flurry of activity, complicated by the complexity of family difficulties, and determining her course of action upon graduation from high school. Shortly before she moved on to college, Katherine had gone on a flight in a light aircraft for the first time. This event influenced her interest in a field and college selection. She said, "I actually applied to all international business schools that have good international business programs, that's what I wanted to do, except for two years before college I flew with my friend's dad and absolutely loved it, it was amazing." She determined she would pursue international business and aviation simultaneously in college. This limited the college selections to only those that offered both disciplines. With the encouragement of her mother, and a reference from a friend of her father's, her attention was directed to the flight program at a neighboring state university.

Katherine became heavily engaged in the aviation program during her first two years in the university, while she took foundational courses for her business major. Katherine's introduction to the field of aviation was challenging.

I was only interested in aviation like two years before I came here. So I wasn't one of those kids that know all along they want to be a pilot, or went to air shows, or knew anything about aviation. I came here and had no idea about anything, and studied really, really hard because some of those things that you just pick up on, by being around aviation as a child, I didn't have.

This new domain had information and skills that were foreign to Katherine and dissimilar with her life experience. Nevertheless, as she continued to study and approach the course work proactively, she began to develop her knowledge and skill. Unlike her brother who seemed to

come by everything so easily, school had never been that easy for her; she had to study and work to make good grades. Her early development of time management and self discipline during high school provided a strong foundation for the rigors of this new setting and curriculum. In her pursuit of aviation education she continued beyond the limits of the program for those who are non-aviation majors.

I never really thought about it. It wasn't an option of should I quit now. It was, this is the next course that you're supposed to take, so I'll take that, and I don't think, I had really decided, or still now haven't decided if I want to fly for a career, or if I want to do business.

She used some of the same strategies that she had in high school to develop a social network within the aviation department by participating in several student organizations.

Well, I joined women in aviation, Alpha Eta Rho, and flying team my freshman year to meet people. I came here not knowing a single person. I came here not knowing anyone, and just like in high school, "I don't have any friends so, okay I'll join everything," and that's just what I did.

Her student involvement provided more than just the social network; it furthered her knowledge and facilitated opportunities that would have otherwise been unavailable. Further, this involvement introduced her to an active instructional role in aviation, placing her in several leadership roles. She developed a review program that furthered the knowledge and competence of other students in the aviation program. Due to the loss of the coaching staff for the university flight team, she assumed teaching responsibilities while still a competitor.

I like doing all of the organizations and being involved with all of the organizing all the stuff. Basically, like the review nights, to help the students to meet people and to make friends and stuff like that. So that's why I like doing dispatch because you get to meet everyone, and flight team is a very tight knit group of people, and I love that aspect of it. I actually felt like a part of the team there.

Her involvement in the student organizations illustrated the significance of others, the importance of social interaction, and development of meaningful relationships for Katherine. This paralleled the prevalence of social engagement she expressed from her childhood and adolescence. Such engagement influenced the involved and caring approach that was an integral part of her frame of reference as a teacher.

**Becoming a teacher.** Katherine's activities with the flight team provided an atmosphere where, "it's just a lot of fun just hanging out with a bunch of people you know everyone very well, and it's just like having another family..." When Katherine assumed the responsibility for leading the flight team competition she had not thought of it as teaching but upon reflection realized that it was formational in her frame of reference of teaching..

Becoming a teacher was not a novel idea to Katherine, she had been engaged in "helping" other students in various classes since she was young and recalled such incidents.

I remember in high school that one of my good friends just didn't understand math. I spent a long time...tutoring her in math. I always really liked the teaching aspect. So that's kind of why I wanted to be a flight instructor. I think, when I helped friends or did flight team I didn't really see myself as a teacher. I was just, I understood something and I was just helping someone, explaining it to someone else and I think when I picture a teacher, I picture someone standing up in front of a class and lecturing. Ah, but I kind of like more of that one-on-one and completely making sure that they understand it. I mean you can see when the light bulb goes off...for a student or for anyone, when your explaining something, and they finally understand it.

Traditional concepts of teaching failed to define her role of facilitating others' learning in the informal environment. As part of a team she found joy in the process of assisting others. Further, she indicated, "...it feels good, it feels like you've helped someone out and they finally get it, especially when they're having problems with it..." The qualities that she found rewarding as a teacher were intrinsic values, reinforced by her concern and involvement with others, and



characterizing her frame of reference of teaching. She elaborated on her framing of being a teacher.

I kind of thought about who are my favorite teachers, and why did I really like them and I think that what makes a good teacher is someone who really cares. When I think back through all the teachers that I remember, that I really liked, they you know, didn't just teach me how to do math, you know, it wasn't just teaching from a textbook, but being engaged in my life and when things were going on in my life, just being there and helping me through things.

For Katherine the ability to teach a subject in multiple ways was another characteristic that made a good teacher. She had found that many professors and particularly teaching assistants (TA) had only one way of teaching something. Framing her role as an instructor, Katherine indicated that she worked at developing close professional relationships with her students and strived to provide various approaches to understanding the complex material for her students.

**Informal learning and problem profile.** She had a student who was having difficulties learning to land the airplane (Table 18.1). She was assigned to her in the second phase of a two-phase process for attaining a Private Pilot Certificate. During the first phase, the pre-solo phase, the students were to operate the airplane solo in the local practice area. During the second phase, the students developed additional skills and knowledge in operating the airplane and navigation from point to point. At the conclusion of this phase, the students would take the practical test for Private Pilot Certification. Initially Katherine employed the technique in by which she was taught to land to enable her student's development. When the approach failed to provide suitable results for her student, Katherine engaged in informal learning through collaboration with other instructors to identify and learn other strategies (Table 18.3 & 18.4). Looking back on the problem she framed the skill level difficulty as being in every phase of the landing sequence.

For this student, approach after approach failed with complex problems in all the various phases of the maneuver.

The problem was that there were so many problems. She was [in the second phase of primary training] I mean she wasn't a [pre-solo student]. She never should have gone solo in [pre-solo phase] or should have passed [the pre-solo phase course]

The fact that the student had passed the previous course, and lacked the requisite skills appropriate to that level, complicated the problem. Based on her expectations aligned with her framing of appropriate student proficiency, Katherine's interpretation and strategy implementation had been influenced by her frame of reference (Table 18.2 & 18.5). In addressing the problem she said, "...I just got a whole bunch of stuff from other people, and I'd like to say that it all ended well and she could land now..." Regardless of her efforts and implementation of various approaches (Table 18.5), Katherine was not able to resolve the student's problems with landing (Table 18.6). Finally, she recommended that the student continue in the next semester with remedial training for the course (Table 18.5). The student initially "brushed off" the probability of not completing this phase of training during the current semester, but it became more evident that much more work was needed to raise her proficiency to a satisfactory level (Table 18.5 & 18.7).

For Katherine this situation was difficult, she said, "...I mean she was a really nice girl and tried a reasonable amount, not overly, but she tried enough, and, and she never wanted to give up..." Katherine's framing of a teacher as caring came into conflict with the situation when faced with the poor performance of her student. This required a reframing of her understanding of the meaning structure of being a teacher (Table 18.7 & 18.8).

Table 18

*Technical Skill and Knowledge Problem, Katherine*

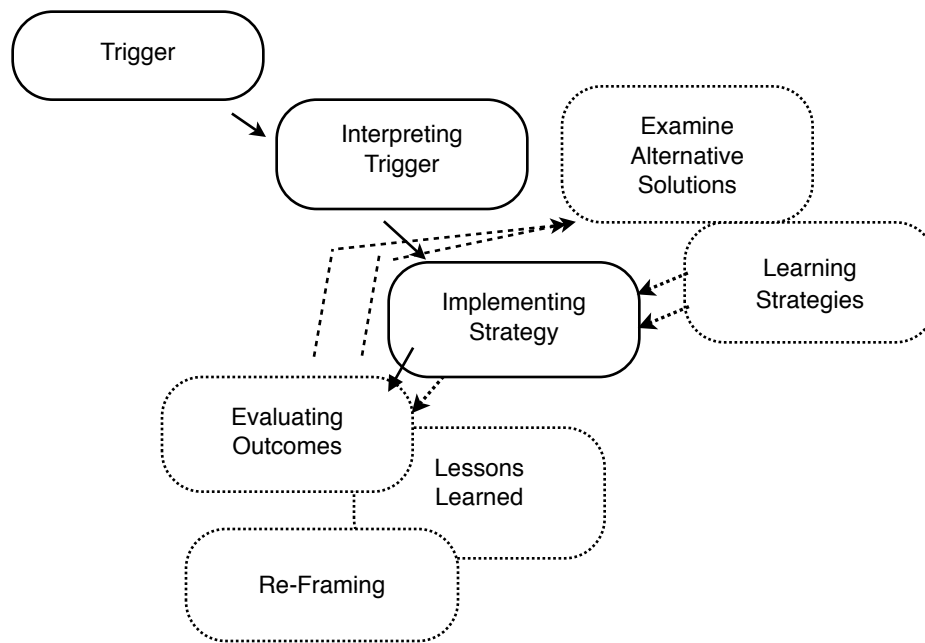
Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Unable to land the airplane safely	
2. Interpreting the Experience	a. Based on her own experience and judgment she determined the problem was deficient skill and knowledge in landing the airplane.	a. Her interpretation was based on her own developed expertise and knowledge the skill (FEE). The lack of appropriate skill continued through the several iterations though the interpretation of the trigger did not change (FEE, WE, BVR, FOR-U)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	a. Bypassed this phase. b. Investigates alternative teaching solutions through collaboration. c. With continued lack of success she continued to seek solutions by experiment and trial and error.	a. She indicated that she considered the situation similar to her own personal experience as a student (PCE) and proceeded to implementation of an approach she had used as a student (FEE, PCE, FOR-U). b. - c. With the failed attempt of her usual approach she worked with others to attempt to find a solution as well as utilizing experimentation (WE, FOR-U).
4. Learning Strategies	a. Bypasses this phase implemented a routine approach. b. Learned of other teaching approaches through collaboration. c. Used experimentation, learning through trial and error.	a. Used a strategy that she had learned in her own pilot training (PCE, FEE, BVR, FOR-U). b. - c. Sought for solution through collaboration and experimentation in an effort to help the student based on her caring and responsible frame of reference (FOR-U, BVR).
5. Produce Proposed Solutions or Implementation	a. Implemented an approach that had been effective for her in training as a student. b. Attempted alternative solutions without success with multiple iterations. Advised the student of possible need of remedial training. c. Student is recommended for remedial training.	a. Implemented the usual approach (FEE, PCE, FOR-U). b. Implements trial and error experimentation (WE, FEE). c. Recommendation to remedial training based on her knowledge and estimation of the required skill level to progress (FEE, WE, FOR-U).

(continued)

Table 18 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<ul style="list-style-type: none"> <li>a. The student failed to progress in landing the airplane.</li> <li>b. With the usual approach unsuccessful she entered the by-passed third and forth phases to examine alternative solutions and learning strategies phase.</li> <li>c. Determined that the student needed additional training.</li> </ul>	<ul style="list-style-type: none"> <li>a. The students failure to improve in the skill was an immediately observable feedback (FEE, BVR, WE).</li> <li>b. After implementation of alternative strategies she continued to work toward a solution based on the lack of demonstrated proficiency (WE, FEE, FOR-U).</li> <li>c. Unintended outcome of a recommendation to remedial training in the student's response (SOC, WE, FEE, FOR-U).</li> </ul>
7. Lessons Learned	<ul style="list-style-type: none"> <li>a. - b. Not explicitly articulated.</li> <li>c. Student response may be different from one's expectations and inappropriate.</li> </ul>	<ul style="list-style-type: none"> <li>a. Implicitly Learned that the usual approach was not working (FEE, WE, FOR-F).</li> <li>b. Required to develop various approaches. She learned numerous methods but found them equally unsuccessful (FEE, WE, FOR-F).</li> <li>c. Student response may be inappropriate (FOR-F).</li> </ul>
8. Framing the Context or Reframing	Not explicitly articulated.	<ul style="list-style-type: none"> <li>a. - b. She expected that the usual approach would remedy the problem but when this approach failed she may have tacitly adjusted her frame of reference (FOR-F).</li> <li>c. Demonstrated the developed framework to reject the plea of the student (WE, FOR-U, FOR-F).</li> </ul>

During this episode Katherine's informal learning process followed through several iterations as depicted in Figure 20. Again, Katherine had initially implemented her usual approach which resulted in an unsatisfactory outcome represented by the solid arrows and boxes. She then returned to learn and develop alternative strategies, represented by the segmented arrows. This process provided her additional learning about various methods and dealing with inappropriate student responses.



*Figure 20.* Informal Learning Process Map, Katherine-1.

Katherine followed through in apprising the student of the potential need to continue to develop her skill through the remedial course from about the middle of the semester. She learned the importance of this from a prior experience with another student that had transferred into the aviation program with a Private Pilot Certificate (Table 19). In compliance with the policy of the university aviation program, the student had to take an introductory course which encompassed the knowledge and skill that had been required in the Private Pilot program, but at an accelerated pace. This student had developed several undesirable procedures and techniques that conflicted with the best practice approaches of the university aviation program (Table 19.1). When Katherine attempted to correct the student she met with resistance at every turn (Table 19.2 & 19.6). Of one approach to the student’s deficiency she said, “...[I] tried to explain we have pretty high standards here, and what he's doing will not cut it.” Finally, after several attempts to remediate the situation it became obvious to her that one of the student’s core problems was a disrespect for her as a woman in the field of aviation (Table 19.2).

I think his problem was the fact that I was female... When we were, I was helping him study for his oral. It was like seven o'clock at night, and we were at the library and I was helping him study for his oral, and we were talking about flyways and corridors and transition routes, and I brought a Chicago TAC [terminal aviation chart] and said, "this flyway [a designated flight route] up the coast. It is gorgeous like, if you have a girlfriend [you could] take her it's really pretty." And he laughed and said, "Women have no place in a cockpit." And I said, "okay, you're on your own."

She indicated that this was mostly "annoying" to her. She had encountered such gender bias on occasion, but it was not the general rule, especially in the aviation program. It was not the issue of surprise, but of the disrespect that this attitude conveyed that was difficult and in conflict with Katherine's frame of reference of the educational setting (Table 19.8). She said, "...it's understandable, it's not that common, it's fine to be surprised, it's a different thing to be, after the surprise think that I'm not qualified and not capable..." Nevertheless, the student's attitude deterred the relationship that she felt was so necessary to a good learning environment and impeded the progress of her student (Table 19.6).

Ultimately she allowed the student to take the end of course practical test, against her better judgement. She made this decision based on the fact that he held a pilot certificate already and he was insistent (Table 19.3 & 19.5). However, the student neglected the procedures that she had taught him and reverted to his old unacceptable approach to flying in spite of her instruction which further indicated his disrespect (Table 19.2 & 19.6). His flight was found unsatisfactory in numerous areas on the practical test. In spite of this, the student was adamant that he should be allowed to attempt the test again. Katherine refused to endorse him for another attempt, although he became angry, she did not endorse the student due to his performance. (Table 19.5 & 19.7).

Through this experience she had learned about communicating the outcome of inadequate proficiency throughout the course to avoid such student assumptions (Table 19.7). She learned

to hold strictly to her evaluation of the competence of a student. She would not provide a recommendation to a student that she felt lacked in any area, including respect for her as an instructor (Table 19.7 & 19.8). She learned to be more forceful in addressing student attitude problems (Table 19.7 & 19.8). Learning from this episode had transformed her frame of reference, as she displayed with the student that had the difficulties with landing the airplane (Table 18.5 & 1.8).

Table 19

*Social Interaction Problem, Katherine*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Improper procedures and practices that conflict with best practice.	
2. Interpreting the Experience	<p>a. - c. Based on her own experience and judgment she determined the problem was deficient skill and knowledge.</p> <p>d. - e. Student resistance to her instruction fosters reinterpretation to a social interaction problem.</p>	<p>a. . The interpretation was based on her own developed expertise and knowledge the skill and familiarity with the procedures of the university program (FEE, FOR-U).</p> <p>b. -c. The lack of appropriate skill continued through the several iterations though the interpretation of the trigger did not change (FEE, WE, BVR, FOR-U)</p> <p>d. - e. She reinterpreted that the core problem was a lack of respect for her as an instructor based on gender bias (SOC, FOR-U).</p>

(continued)

Table 19 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	<ul style="list-style-type: none"> <li>a. Bypassed this phase.</li> <li>b. - c. Investigated alternative solutions through collaboration and experimentation.</li> <li>d. With continued lack of success she responded with an intuitive response initially.</li> <li>e. With continued non-compliance she recommended remedial training.</li> </ul>	<ul style="list-style-type: none"> <li>a. She indicated that she employed the usual approach to address the deficiencies (WE, PCE, FOR-U).</li> <li>b. - c. With the failed attempts of her usual approach she worked with others to attempt to find a solution as well as utilizing experimentation (WE, FOR-U).</li> <li>d. Her understanding of social norms fostered an intuitive response (SOC). Yet, she allowed the student to take the practical test base on his holding a certificate already (FOR-U).</li> <li>e. Continued non-compliance resulted in her recommendation to remedial training (WE, SOC, FOR-U).</li> </ul>
4. Learning Strategies	<ul style="list-style-type: none"> <li>a. Routine approach.</li> <li>b. Learned of other teaching approaches through collaboration.</li> <li>c. Used experimentation and learning through trial and error.</li> <li>d. - e. Intuitive response to the situation.</li> </ul>	<ul style="list-style-type: none"> <li>a. Used a strategy that she had learned in her own pilot training (PCE, FEE, BVR, FOR-U).</li> <li>b. - c. Sought for solutions through collaboration and experimentation in an effort to help the student based on her caring and responsible frame of reference (FOR-U, BVR).</li> <li>d. - e. Strategies learned through social interaction apart from the direct experience in aviation (SOC, FOR-U).</li> </ul>
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Implemented an approach that had been effective for her.</li> <li>b. - c. Attempted alternative solutions with limited success with multiple iterations.</li> <li>d. In spite of the student's attitude she allowed the student to take the practical test.</li> <li>e. Student was recommended for remedial training.</li> </ul>	<ul style="list-style-type: none"> <li>a. Implemented the usual approach (FEE, PCE).</li> <li>b. - c. Implemented trial and error experimentation (WE, FEE).</li> <li>d. Intuitive response to the student founded on her experience in the social milieu and culture (SOC, FOR-U). Allowed the student to take the practical test aligned with her frame of reference as caring (FOR-U).</li> <li>e. Recommended the student to remedial training based on her knowledge and estimation of the required skill level to progress (FEE, WE, FOR-U).</li> </ul>

(continued)



Table 19 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<ul style="list-style-type: none"> <li>a. The student failed to progress in complying with established procedures.</li> <li>b. - c. With the usual approach unsuccessful she entered the by-passes third phase to examine alternative solutions and learning strategies phase.</li> <li>d. Determined that the student lacked respect for her as an instructor which impeded progress. Student's regression to unacceptable procedures an unintended outcome of the practical test.</li> <li>e. Recognized that the student was angry as a result of not being allowed to reattempt the practical test.</li> </ul>	<ul style="list-style-type: none"> <li>a. The students failure to improve in the skill was an immediately observable feedback (FEE, BVR, WE).</li> <li>b. - c. After implementation of alternative strategies she continued to work toward a solution based on the lack of demonstrated proficiency (WE, FEE).</li> <li>d. The identification of the lack of respect of the student had personal effect on her (SOC, FOR-U).</li> </ul>
7. Lessons Learned	<ul style="list-style-type: none"> <li>a. - c. Not explicitly articulated.</li> <li>d. Attitude problems complicated the process of learning.</li> <li>e. On some occasions one must be forthright in communicating the poor performance of the student.</li> </ul>	<ul style="list-style-type: none"> <li>a. Implicitly learned that the usual approach was not working (FEE, WE).</li> <li>b. - c. The resistance of the student required stronger measures (WE, FOR-F).</li> <li>d. - e. Allowing the student to take the practical test provided negative outcome and stricter measures were intended for future use (FOR-F).</li> </ul>
8. Framing the Context or Reframing	Explicitly identified that the students lack of respect had an impact on the learning situation and her own motivation.	Reframed her role and responsibility as an instructor developing critical approaches to meeting the various facets of instructing in the aviation environment.

Katherine's informal learning process in this episode is depicted in the Figure 21. As in other episodes, after interpreting the trigger, she responded intuitively with her usual instructional approach as depicted by the solid arrows and boxes. When this approach failed to yield satisfactory results she returned to phases three and four to determine and learn another approach as depicted by the segmented arrows. Ultimately, she reinterpreted the situation as a social interaction problem. She then followed this interpretation with intuitive approaches to

resolve the conflict. She indicated that learning through her actions in this episode, she changed the way she would approach future issues. This indexed her frame of reference transformation.

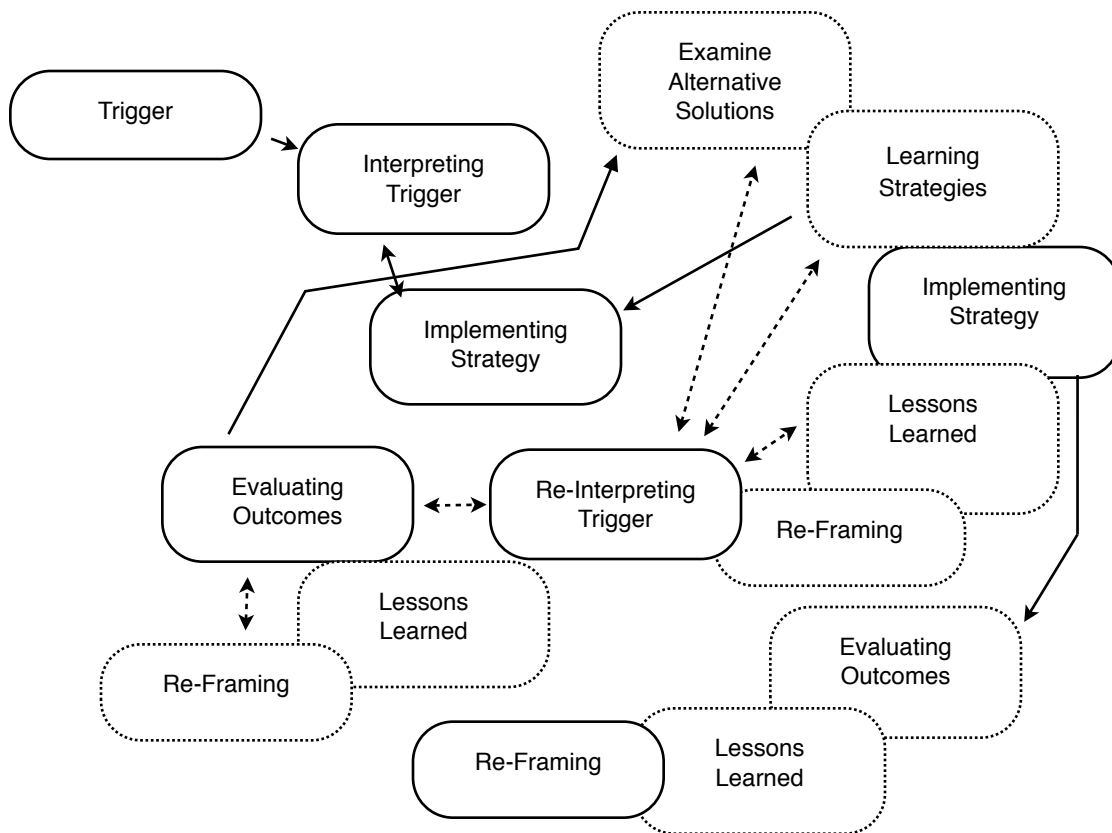


Figure 21. Informal Learning Process Map, Katherine-2.

As she reflected on her learning as an instructor, Katherine cited the importance of using various ways of presenting a subject to a student as a part of her frame of reference of teaching, she learned additional strategies from others, through innovative approaches, and independent study. In the latter case presented, her efforts proved to be unsuccessful. However, in other cases her approaches had resulted in the facilitating the students' learning. Problems often had an affective dimension both for her and the students, complicating the resolution of the more clearly defined skill or knowledge problems. For Katherine attitude problems were far more difficult to resolve than the skill and knowledge problems one encounters in aviation training.

Katherine's experience formed a frame of reference that she carried into the field of aviation instruction which acted as a filter for the experiences she met. This frame of reference had been garnered from various experiences and interactions in her lived-experience from childhood into her early flight instructing activities. Her frame of reference had been transformed as she engaged with her students specifically, and in general through other aspects of her lived-experience. She articulated the transformative effect of learning through her experience as a teacher and the tension that was resident in her development.

I kind of see a teacher as someone who cares a whole lot but, that's also to say that me as a student, I tried really hard. Things were not always a piece of cake for me. I had to study in all my classes...I definitely had to study for every test and worked really hard for it. So I think now, as a teacher, if I see a student who doesn't try, I don't try as much. Which I know is a downfall, that I should still try just as hard. But it, or I guess, I have a lot more empathy for someone who's trying and giving everything, all they've got. Going back to those first two students I had, and I mean we obviously did the same ground discussion with both of them. But, one of them tried so hard and I mean I did everything I could to help him, and understood that yeah, it takes little bit longer for some people.

## **Diñez**

Diñez was the youngest of four children and had three sisters and a brother. She grew up in a suburb of a large midwestern city. Her father was a self employed owner of a manufacturing business, her mother stayed at home until she was in grade school. She described her family experience, "...very family oriented, like my parents were very involved with what we were doing...". Diñez recounted with pride the stories she had heard of her father's immigration to this country, of his attending school with limited language skills, and managing to attain acceptance and graduation from college.

He came here, like he was 15 or something, put himself through college, was working full-time job, and he eventually got his [degree]. I think he was in

mechanical engineering, and just started his company in our basement in our house and then eventually blossomed into this pretty successful company.

Her father's work required long hours and absences from the home.

I remember my dad, whenever he was traveling or something, my mom [would] take us out on the weekends to do little, little trips out to like Wisconsin and Michigan stuff like. So then we would do like a the larger family like Christmas vacation. So that was always nice, you kind of like regrouped after that, you just hung out.

Shortly after her father's immigration to the United States his parents also immigrated and settled near Diñez's family. Her mother's family also lived in the same area allowing both sets of grandparents to be involved with Diñez. While she was in grade school her mother returned to work, eventually returning to college herself, choosing a course in medical transcription which enabled her to spend more time with her family. Diñez described strong family ties that modeled a strong work ethic, "...so both my parents were extremely hard working I think we all got that mentality, and they're still working hard and they're still going strong..." Diñez remarked that her family's interactions and relationships fostered strong family ties and experiences.

I remember we would call her like two or three times at work, and we would be like he said this, and she said this, and just little arguments that your like, you don't even remember now what you were fighting about. All you know it is that you are mad at the point. But, as old as I was to pick up the phone and dial it calling my mom and crying. But, I think we all like tried to get along. It was, we were just butting heads for a long time too. So we're like totally extreme, we either like really get along and not get along at all.

The nurturing of her parents facilitated a collective family experience but did not necessarily restrict the individuality children.

My parents never really forced any of us to do anything. "Oh, you want to try this, so you want to do this, okay let's go, you want to take dance lessons, okay." They were pretty much like anything goes, anything you want to do, anything you

want to try, and they never forced any thing like values or anything they have on us. It just kind of was, you'll get there.

Diñez framed each member of her family as talented, individualistic; yet similar, having been brought up in the same environment. Her oldest sister became a supervisor in a hospital, though she was trained in music education. Her brother attended a local community college then transferred to a nearby college to complete his degree in audiovisual production but he had aspirations to become a “rock star.” Her next older sister had followed a number of pursuits including becoming a flight attendant, commercial pilot, and had become “a stay at home mom with three kids.” Diverse as the family was, each child had participated in many of the same extracurricular activities.

I remember my mom sent me to registration in elementary school, and I signed up for like everything that I remotely had an interest in doing. I was like Eagle club, chess club, everything you know. I just I wanted to try it you know. I got started young trying to figure out what was out there or what I liked. I always played soccer. I think all of us actually played soccer. It was kind of like a family thing.

Her most prominent activity was band. She began playing the clarinet in grade school and characteristic of the nature of hard work embedded in her family heritage, she excelled. During her time in middle and high school, the clarinet became a resource of emotional expression and release.

Personally, like playing clarinet was another way to express your emotions. If I got super upset one day, I would go home, and I would practice. I'd go home and play [clarinet]. So I don't know, there's something about it like performing is really exhilarating I think, and I don't know, being successful at something.

She enjoyed the friendly competitive atmosphere of the school band and her accomplishment with music would serve her as a means of continuing her education.

Originally [I] wanted to go into engineering. I had a dream of taking over my dad's company, and I was like, I want that company in my family name and I want

it, and I want to do it all. And I applied to like three or four different places and didn't get in.

Diñez was disappointed by being rejected but was intent on going to college and began to seek other programs

Even though I had seen one of my sisters not go to college and do something else. The way it works in my mind you go to high school and then if you want you continue on. And even as you know junior or senior in high school, I thought that higher education is extremely important. So I think I always wanted to go on. And I love school, I've always loved it.

During the process she reflected on her oldest sister's experience at the university as a music major. She thought there was a possibility that she might be accepted based on her skill with the clarinet even though admission to the college of music was very competitive.

I think it was then that I started really talking to my oldest sister like how's [the university]. You know, because I've always come down here for band camp in summer camp, and I really liked it down here, and so I was like; I really want to go to [the university]. I'll get in there whatever I can do.

Her application and audition for music performance resulted in admission to the music program. Diñez began at the university the fall following her graduation from high school, “pouring herself” into her music and studies.

Diñez faced several trying events during this early college experience.

There was kind of a lot that happened towards the end of my freshman year and early in my sophomore year...I almost made the decision to go home and stop college...[There was] family stuff, going on that I wanted to be home for. My grandmother had developed cancer, and so the summer going into my sophomore year was spent, there were like my brother was home, I was home, and in my oldest sister was home and we took turns taking her to her treatments, and I just, and I was really close to her.

November of her sophomore year her grandmother passed away after battling through the summer. This left a void in Diñez's life and in her family support system. At about the same

time her father's company, which she had dreamed of having one day, suffered a setback as a result of a merger that went wrong.

I think part of the reason that I just wanted to be home is because I knew that my dad was going through a hard time, which was putting my mom through a hard time. I mean all of her kids were gone, and it's just my mom and my dad, and my dad's working way overtime more than he ever did before trying to like save his business, and I felt bad for my mom, but I also wanted to be there.

Along with these intimate troubles at home, Diñez experienced a growing dissatisfaction with her music program. She pointed out two events that clearly marked this problem. The first was that she was required to select another instrument to minor in to meet the degree requirements. Secondly, her oldest sister had given up hope in a music career, changing fields, and returning to school in a business program. Diñez termed this time as, "...the darkest days..." of her life. Diñez entered a serious depressive period that became a major concern to Diñez and her parents. So serious were these conditions that on one occasion her parents made a special three-hour trip, late one evening to insure that she would get professional help the next day. Looking back on that period Diñez remarked that, "it didn't seem possible that she could have felt as she had, that it wasn't like her."

Depressed and discontented with the music program, Diñez looked for other avenues of competing her education. About this time two events shifted the balance for Diñez. First, her father became interested in flying through participating in a reconstruction project of the Wright Flyer at a local airport. This led her to "...hang out with him at the airport..." on the weekends when she came home, which was more frequent now. Second, her next older sister, who she was closest to, had returned home with a pilot and instructor certificate and took her flying in a small airplane for the first time.

She rented an airplane out of out of the aero-club... Yeah, so she let me fly and everything, and I was like, “oh, this is awesome”...And it wasn't until a few months later, after my sophomore year was completely done, that I was trying to think of something to do [at the university] and I was like, “I don't want to leave the University.”

Following this idea she said,

I called up [the aviation academic advisor] Lydia, and I said, “I'm really interested in coming for tour and I'm already a student here, I just want to come and visit see what it's all about.” So my parents took a day off of work, and we all three drove down here, and I met with Lydia...I got a tour...I just remember Lydia sitting in her office, she was like, “So you really want to fly?” And I was like, “yes” [emphatic], because after I set foot in one of the airplanes I was like, “oh man I really want to do this. I'm in the plane now, and I want to fly.” And so she was, “you really want to fly?” And I was like, “yes” [with emphasis]. She signed a piece of paper and says, “here you go, you're in.”

The outcome of the visit with her parents was “as a light in a dark time” for Diñez and marked a return of enthusiasm and confidence.

There were so many good times that semester that I just kind of started right back up and, okay I'm Diñez again. And then, when the spring came around I was so happy to start something new, and my first flight was probably just as exciting as the first one that I'd ever gone on with my sister.

Progress through the aviation program was not without difficulty, but it came with enjoyment and satisfaction. She progressed through the early semesters with the intensity of her younger days gaining in skill and knowledge in the field of aviation.

**Becoming a teacher.** Diñez was influenced by those around her in her choosing to continue into the instructor program though the curriculum did not require it for graduation. She considered the course beyond her ability; however, a conversation with a former instructor encouraged her that she would do well and be a good flight instructor. This was supported by her mother as well.



I was talking to my mom I was like, “you know mom, I always wanted to teach but I just never thought of flight instructing,” and ah, I just, I don't know, I signed up for it and ended up really liking it because I had Jim and it was fun.

After completion her CFI, Diñez completed her Instrument Instructor (CFII) and Multiengine instructor (MEI) certification while she taught her first student. Diñez was offered, and assumed a full-time flight instructor position in the university aviation program shortly after this.

Her family had played a significant role in forming her personal values and characteristics. Her father's immigration story, determination to put himself through college, and start his own business had been examples that she replicated in her intensity life, school, and work. Her mother's efforts to expand her children's understanding of the world, while continuing her own education had provided a framework of exploration. Such hero narratives and support facilitated her belief in her ability to do things that were novel and difficult. Her family heritage was one of a hard working, family centered home life, coupled with latitude and support to explore various facets of life individually.

Diñez's early ideas about the meanings of teaching and being a teacher had been formed at home and by her interaction with teachers through her own educational experience. Reflecting on being a good teacher she said,

I kind of had to sit down and think of why I thought of them as a good teacher, and they were someone that I would confide in. That I would go to and talk to them if I had a problem. They've gotten to know me as a person. More than just a student.

This frame of reference of teaching formed the foundation from which Diñez approached her students. Some of the situations and problems that Diñez faced as a new flight instructor illustrate the challenge, influence, and transformation of her frame of reference through her informal learning process.

**Informal learning and problem profile.** Díñez's early teaching experience presented challenges to her framework of fostering an effective relationship with her students (Table 20).

Díñez had two students her first semester as a flight instructor. .

I was so torn that semester because, it started off like, with the journal entry, I thought he [Peter] had it. You know, he was like, this does, and this does, this and this does this you know and Sean, who I feel like just as kind of faded in the background because that semester was so focused on dealing with Peter, he was actually really good. So I had one pretty good student, and the other one that eventually, like maybe part way through the semester, I was already fighting with to try and come out.

The semester began with the students demonstrating reasonable performance and interest; but then one student displayed extensive knowledge problems (Table 20.1 & 20.2).

With Peter the first four or five flights are just fun. You go out, and you learn how to do straight and level and turns and climbs and descents and its good ol' time. And then, you start getting into more procedures, and you have to study more and you know, it gets a little bit harder.

The degeneration in the performance of this student made progress impossible for Díñez (Table 20.6). She engaged in several iterations of informal learning through trial and error, collaboration with other instructors, and experimentation as she worked to resolve the student's performance problem (Table 20.3, 20.4, 20.5 & 20.6). The student had problems in several areas including basic flying skills, communications, and understanding operational procedures. A conversation with the student caused her to reinterpret the problem (Table 20.2).

We were walking out to the airplane, and he was, "Like man, I'm so tired today," and I said, "well why?" And he said something about rush, about something about his frat [fraternity]. And then after we kind of broke that ice, every time we tried to fly after that he was telling stories about being out with the guys and doing something for rush. And I think his priority then was being in a fraternity.

Diñez's frame of reference held expectations that students would be motivated as she had been (Table 20.2). She had set priorities and managed her relationships throughout school such that her social and personal issues, even in her difficult family situations, did not negatively impact her work for school. Illuminated by the conversation she continued to work with this student, attempting to address this social interaction problem along with his technical skill and knowledge deficits; but his lack of investment in the curriculum impeded his progress (Table 20.5, 20.6, & 20.7). Though in conflict with her personal ideology and identity of being a teacher, Diñez finally decided that the student was not proficient enough to progress to the next stage of flight instruction and needed remedial training (Table 20.5, 20.6 & 20.7).

I felt pretty bad after that, but when I sat down and thought about why this happened and looked back over the whole semester. Every thing that had happened, that you know I pretty much talked myself into saying it was good decision and that there was nothing to feel bad about.

Diñez, "looking back," came to frame the situation and responsibility differently recognizing that, although she knew that students were different, in some cases changing an approach to develop a skill or knowledge was not able to address the core issue impeding his or her progress (Table 20.7 & 20.8). She said, "...I feel like it almost would have been a failure for me if he didn't understand it, and I was so obsessed with finding different ways to explain things. That, I don't know, it almost became like I wanted him to do well for me..."

Diñez remarked that social interaction problems were more difficult to identify and address than the skill and knowledge problems (Table 20.7). She relied on social skills that were foreign to her frame of reference for learning and teaching in aviation. Finally, she experienced a transforming of her frame of reference regarding teaching and the learning environment (Table 20.8).

Table 20

*Social Interaction Problem, Diñez*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Inadequate performance in multiple aspects of flight.	
2. Interpreting the Experience	a. Skill level and knowledge level deficiency with the increasing knowledge requirements. b. - c. Bypassed reinterpretation in subsequent iterations. d. Reinterprets trigger as a social interaction problem through a conversation with the student.	a. Based on established criteria, and her estimation based on her history and experience as a student (FEE, FOR-U). b. - c. Continues to address the trigger based on her original interpretation (FEE, FOR-U). d. The revelation of the student's activity in a fraternity moderated her original interpretation based on her experience with her college experience (SOC, FEE, FOR-U, FOR-F).
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	a. Not explicitly articulated for the first iteration. b. Examined alternatives to address the trigger having her usual teaching approach prove unsuccessful. c. Consults with others. d. Continued to develop alternative approaches to address the student's skill problem but also to address his lack of focused attention to the discipline.	a. Appears that she bypassed this phase expecting the usual approach to address the issue (PCE, FEE, FOR-U). b. With the failure of the original approach she returned to seeking alternatives in line with her frame of reference of helping students (FEE, BVR, FOR-U, FOR-F). c. Employed collaboration to expand her repertoire (SOC, FEE, WE, FOR-U, FOR-F). d. In line with her framework of defining her responsibilities she sought additional supports and strategies from others (SOC, FEE, IEE, FOR-U).
4. Learning Strategies	a. Not explicitly articulated for the first encounter. b. Utilized trial and error c. Employed collaboration with peer and senior instructors. d. Continued to consult others including this new caveat of the social interaction problem.	a. Utilized strategies that she had adopted as a student through her instructors and the formal course work (FEE, FOR-U). b. Engaged in learning new approaches through trial and error (FEE, WE, FOR-U, FOR-F). c. Learned alternative approaches through collaboration (FEE, WE, FOR-U, FOR-F). d. Embedded in the process she learned alternative approaches through collaboration and experimentation to address the social interaction issue (FEE, SOC, WE, FOR-U, FOR-F).

(continued)

Table 20 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
5. Produce Proposed Solutions or Implementation	<ul style="list-style-type: none"> <li>a. Implemented a usual approach to address the trigger as interpreted.</li> <li>b. Implemented various strategies.</li> <li>c. Implemented strategies derived from collaboration.</li> <li>d. Implemented strategies from trial and error and collaboration.</li> <li>e. Recommended the student to remedial training.</li> </ul>	<ul style="list-style-type: none"> <li>a. Implemented the usual approach based on her own learning (FEE, FOR-U).</li> <li>b. Implemented trial and error methods (FEE, FOR-U, FOR-F).</li> <li>c. Continued to try to address the trigger implementing suggested strategies (FEE, WE, FOR-U, FOR-F).</li> <li>d. Continued to try to address the trigger implementing suggested strategies. Finally, recommended the student for remedial training (FEE, WE, FOR-U, FOR-F).</li> </ul>
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	<ul style="list-style-type: none"> <li>a. Not explicitly articulated for the first iteration.</li> <li>b. - c. Not explicitly articulated, implied by continued activity.</li> <li>d. Refereed to conversations with senior instructor which reflected her assessment of the lack of suitable response from the student. With the determination that the student lacked the appropriate level of proficiency and knowledge reentered implementation.</li> <li>e. Terminated instructional relationship.</li> </ul>	<ul style="list-style-type: none"> <li>a. Implicit assessment of the outcome is an unsatisfactory result from the initial and subsequent interventions. As with her initial interpretation of the trigger this is based on her knowledge of standards and experience. This initiates a return to and overlaps with an examination of alternate strategies (FEE, FOR-U).</li> <li>b. - c. Embedded in her attempts to resolve the student problem, she reframed the situation and her own understanding of teaching as a part of assessment (WE, FOR-F).</li> <li>d. The outcome resulted inadequate performance by the student (FEE, WE, FOR-U).</li> <li>e. Outcome required termination of the instructional relationship. Carried emotional disquiet for Díñez (FEE, SOC, FOR-U, FOR-F).</li> </ul>
7. Lessons Learned	<ul style="list-style-type: none"> <li>a. - d. Not explicitly articulated for the first encounter.</li> <li>e. Acknowledged the recognition of a need to be more forceful from the beginning with her students.</li> </ul>	<ul style="list-style-type: none"> <li>a. - d. Embedded in assessment of the outcomes and implicit in the continued situation was her learning through the various iterations that such methods are not effective. She persisted in accordance with her frame of reference as a teacher (WE, FOR-U).</li> <li>e. Learned the nature of the student's motivation adversely influenced the learning environment (FEE, SOC, FOR-F).</li> </ul>

(continued)

Table 20 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
8. Framing the Context or Reframing	<p>a. - d. Not explicitly articulated for the first iteration.</p> <p>e. Reflectively indicated that the student's priorities were not aligned with the learning required for the discipline.</p>	<p>a. - d. Embedded in the sequence of each iteration she adjusted her frame of reference of appropriate methods (WE, FOR-F).</p> <p>e. Díñez indexed a transformation in her frame of reference illustrated with a later student based on the learning from this experience (SOC, WE, FOR-F).</p>

Díñez's informal learning process is depicted in Figure 22. She had interpreted the student's problem initially as a technical skill problem and proceeded with her usual teaching approach as represented by the solid arrows. After several iterations attempting to address the skill and knowledge problems, she reinterpreted the situation as a social interaction problem represented by the segmented arrows. Though she attempted to address both, the social interaction and the technical skill issues; she was unable to resolve the problems. The decision to recommend remedial training of the student conflicted with her frame of reference which held that hard work could accomplish many things. This disjuncture stimulated a transformative informal learning process and reframed her ideas of being a teacher. The interwoven, overlapping, and non-sequential nature of her informal learning is represented by the segmented boxes and by-directional arrows. Learning in this process was sometimes unrecognized until Díñez participated in the reflective process of the interviews. The tacit nature of her learning is represented by the segmented boxes. In retelling the story she reframed her understanding as she reflected on the events (Table 20.8).



Though disappointed again, she now recognized that the student bore, or at least shared responsibility for his learning (Table 20.8).

Diñez said her students were not all difficult, that she also had some “amazing” students that were “fun” and worked hard achieving a successful outcome. Success, she said, was for “...not only themselves...” but for her as well, but she had learned that it was a shared responsibility.

Some of them [students] just that I've had just kind of don't care. I feel like there are kind of throwing money away too, and I kind of brought into my whole thing, you know the first day when you meet your students and the orientation and everything. And I kind of brought into that and they are reminded throughout the semester you know. “when you give up I do to.” I mean, “I'll try but when you're not giving 100% you know I might not be given 100% either.” So I try to kind of share a give-and-take with students.

The experiences Diñez had with students, the interaction with, and observation of other instructors had inspired and reframed her aspirations of being a teacher. Her informal learning proceeded through a series of step-wise sporadic events and situations requiring multiple visits with the various phases of the informal learning process. Her resources, strategies, and inspiration had come from many sources. She acknowledged that her frame of reference of teaching had developed through the workplace environment, particularly through her peers.

I think everyone wants to teach well and do well...I get, if I try to fly extra with a student, or come out early and try to fly, or help my student like trying to go above and beyond. Sometimes I get comments that are like, “oh, whatever they're just going to go [to remedial] anyway.” They're just like, “oh, give up...” So I actually think that that's helped me work harder or changed for the better and okay like, “I'm not going to give up just because you say so.” But, I have actually gotten a lot of really good ideas for training from some of the other instructors. Just you know just different techniques to do...then just being in the hallway that I'm in. I mean just hearing the interactions between some of the other instructors and students...then being across from Don...I mean he's so kind to the students,



and very patient, and like most of the older instructors, like that's what I want to be like, that's what I strive to be.

## **José**

My parents are from Mexico...they grew up in Guadalajara. That's where they met, they got married there. They had my older brother; my older brother's Mexican...he was born in Guadalajara...my parents decided to migrate to the United States. They went through the whole process of crossing the border. My mom had her brother that was staying in California, so that's where they were going to California...they crossed the border; they stayed with my uncle...I was born there.

After relocating to California, both of José's parents found work but soon after José was born, the company that his parents worked for suffered a setback due to an economic down turn and his parents were laid off. Unable to find suitable work in the area the family moved back to Mexico.

While José was in the third grade his father relocated to a midwestern city in the United States again to find work. His father worked about 18 hours per day at three different jobs to save enough money to bring his family back to the United States. At first, the family, now consisting of José and his three brothers, his mother, and father, lived in the basement of a relative's house. After a year of living in the basement, the family moved into a one bedroom apartment. In this apartment, the boys occupied the one bedroom of the apartment, while José's mother and father occupied the living room area. The common area for the family was the small kitchen.

We were living like in the bottom level of the apartment. It was a real old apartment. And I remember that every time it rains we had water coming in from the ground...We had one of those beds where the bottom part you pull it out, so my oldest brother and my youngest brother would sleep in the top, and then myself and my brother that's right under me would sleep in the [other] one...We lived there for, I don't know, like two years in that apartment, because it was the only thing that we could afford.

Jo  e faced additional difficulties in school in this new location. Although he had not completed the fourth grade he was required to move to the fifth grade because of his age. To complicate the situation even more, the only language that he spoke at this time was Spanish. Because of his language situation, he was in an English as a Second Language program (ESL) as well as in his other courses. He and others like him were the object of abuse from other students about their lack of English skills.

It was kind of weird cause, like me from my bilingual class and everybody like from multilingual class would just like make fun of us, because we didn't speak English...They would say like, "oh, ha, ha, ha you beaners" and all that even though they were Mexicans too but, they speak English.

Jo  e's parents provided support and encouragement for him in these negative social situations.

At first it was kind of like, "Man, I'm a beaner, I'm a beaner, I'm a beaner, well that's okay." But, then I remember talking to my parents and being like, "at school they called us this because we didn't speak English that well," and all that. [His parents responded] "you know what, they're crazy, no way, you just do what you got to do, and then you'll shut them up."

Jo  e was inspired by his parents and working hard he overcame his language difficulties and educational setbacks. He moved to the head of the class, in spite of his early language difficulties, and was honored as valedictorian by the completion of middle school.

Along with the difficulties in school Jo  e felt keenly his family's low socio-economic status. His family received needed help through public assistance programs such as food stamps and public housing.

Where I live, most of the people there use stamps. So that's why I was just like...I guess it was just like in me, "I'm using stamps I'm poor," like all right, "I'm using stamps that means I'm poor because we can't buy food." But, everybody in the neighborhood where I live was like that.

Jo  , mindful of these difficulties, worked hard and excelled in school where others in similar circumstances struggled. Drugs and gangs were a part of daily lived-experience for him in his environment and many of his peers fell prey to these devices of the cultural norms. Yet, Jo   avoided the peer pressure and invested himself in his studies.

I guess it was just all my parents. I remember, my dad and my mom never told me, "Don't use drugs, don't mess with them, or don't hang out with them." I remember one day my dad was like, because he finished third grade and that was it, because he had to work to help this family...my mom finished sixth-grade, and that was it. So their main thing was, "If you want to end up like us where we had to work even harder to bring money, then go ahead and do what you want to do. But, if you want to be better than us, and just go and apply for a job and get that job because you have the education, then you have to concentrate on your studies."

Through a Civil Air Patrol (CAP) school program Jo   had his first opportunity to fly in a small airplane. This sparked an interest in flying and the consideration of a career in aviation. Additionally, he became involved in a high school ROTC program. Aware of his families financial limitations, he made decisions about his education that would help with financial responsibilities for both high school and later for college. This meant he would have to turn down educational opportunities and assume a financially responsible approach to his education.

My seventh grade teacher, my eighth grade teacher, wanted me to go to a better high school. Because the high school around my neighborhood was just gang banging and then nothing going on. But those other high schools were expensive. You had to pay money, and my parents didn't have money for that. So I just decided to go to my local high school.

Similarly he enlisted in the National Guard, as early as his age would permit, to gain the needed financial support for college. After his initial National Guard duty the summer after high school, he applied to and was accepted by the state university. Jo   had wanted to get into the aviation program but was initially accepted in general studies program because of a

misunderstanding in the enrollment process. He transferred to the aviation program after his first year at the university.

During his childhood, José's parents worked a shift oriented approach so that one of them would always be with the family. When his father would be at work, his mother would be at home with the family. Then they would change responsibilities and while his mother was working his father would be home for a few hours. Eventually, José's father was able to reduce his work responsibilities by taking employment in a local school. This allowed him to quit two other jobs and still have enough income to support his family. His mother was employed in the school kitchen at first but then she returned to school, completed her GED, and continued in a college program to become a teaching assistant in special education.

Education was a priority for José's family based on the hope that education could provide a better life. José would be the first to graduate from the university, while his older brother had completed his degree in computer science at a college near their home. José's older brother helped him with his financial needs for college as financial resources continued to be stretched for his parents. His younger brother was also attending the university, studying anthropology as a foundation for a career with the FBI. Additionally, he expected his youngest brother to enroll for the fall term as well. José remarked,

I'm the second one from like my immediate family that is finish college.  
Hopefully, all four of us finish, all four of us, then we go from there...And out of  
my parent's family we'll be the first family [that] goes to, goes to college.

School for him had not been easy as he had faced the ridicule of peers in his grade school, resisted gangs and a pervasive drug culture in high school, and in spite of these deficits excelled in both environments beyond his peers. This success he attributed to the encouragement

and support of his parents. During his second year he became “distracted” and failed to meet scholastic standards for the university.

So I started getting bad grades and by the end of my sophomore year I got kicked out of the university, for having bad grades...Most of it was...I'm on my own and if I wanted to go to class okay and if not then I don't have to. So most of the time I would just stay in my room watching TV or I would go to class and just sleep.

José's addressed this situation by spending a semester attending a local community college and redoubled his efforts in school.

I went to Parker I took some classes there. I got a good GPA to transfer back. So transferred back to the university but aviation didn't take me back. So I went as a Spanish major. So my spring semester I did here. My junior year I was a Spanish major and then I got my GPA high enough so I could transfer back to the aviation [program].

The adversity helped José develop a self directed approach to overcoming the obstacles before him. He remarked,

I was more focused in like studying...then just concentrate on my studies...as soon as I got back to the university I've just been trying to get my GPA up there...it's not high but I got it up almost the whole point...

Symbolic of his respect, José never allowed his family to know of this problems in the university.

I didn't tell my parents. So to this day my parents don't know I get kicked out of school...and it's just...I don't know, it's just like disappointing to tell my parents you know what, I got kicked out. It's just kind of disappointing, and I just didn't want to go through that. So no one in my family knows, not even like my brother that is here with me. I mean that's why, with him, I'm just trying to keep on pushing him, “come on, come on,” I mean, I don't want him to do the same thing that I went through.

His experience of losing his focus had emboldened him on behalf of his younger brother, to become an encourager and support to him. Strongly influenced by his parents, José displayed a

deep respect for his family history and the affirmation that he had experienced throughout his childhood, adolescence, and young adulthood.

My reason why I was doing all this [education], is for my parents. Because like my dad, working those three jobs when we first got here. That meant a lot to me and to my family. So my goal is to buy my parents their house and have them stop working and I'll take care of everything else. And that just kept me going.

Jo   had adopted a supportive caring role for his family and this was a characteristic that he believed should be emulated by an instructor.

**Becoming a teacher.** At first, Jo   wanted to become an instructor because of the need for the flight experience that could be gained without additional cost to him by providing instruction to others. However, looking back on his first semester he remarked,

But after this semester it's kind of different. It's like, "oh, it's, it's, cool, to be an instructor." It's a different experience...I had a good experience this semester with my student... At the end of the semester, it's just a good feeling it's like, "wow, I got them through this whole semester. I got him through this first part of this private pilot license." So it's just like a good feeling of like; I'm doing this. And then, when he passes something or does something good it's just like, "yeah, he got something," I mean.

When his first student had passed his practical test, Jo   said that he had called home to share the success with his father and mother. He remarked that they all rejoiced together, it was an affirmation of all that they had invested in him, all that he had invested in his work to become an instructor. He had struggled at times in the aviation program but as he had persisted in earlier schooling he had faced and overcome the obstacles and found gratification in the success of his first student.

**Informal learning and problem profile.** Jo   was the least experienced of all the participants, just completing his first semester of teaching at the time of the interviews. His experience that first semester of teaching, was not without difficulties (Table 21). He said, "at

first it was like up-and-down, he didn't get slow flight..." Such difficulties are not uncommon in the aviation training setting, but pose an opportunity for instructors, particularly new instructors to engage in informal learning about teaching and interacting with others in the aviation education setting (Table 21.1). In José's case, his first student was an international student from Spain. They were deterred from starting at the beginning of the semester because of federal security requirements. José indicated, "...I was getting, not upset, but like I was feeling bad because I was falling behind...then people were like, oh I've got five hours of flight, oh I've got this many hours of flight, I was like, oh, I hope I can finish the semester..." The anxiety of falling behind illuminated an emotional element in the context of teaching in the university aviation program. This delay coupled with the complexity of the required skill and knowledge compelled him to use available resources to expedite the student's learning (Table 21.5).

It was some weeks into the semester when the student realized that José could speak Spanish.

I remember one time where I was with my student and one of the other instructors came by and was like, "Hola!" And I responded like, "Hola! Como estas?" and my student turned around, and he was like, "You speak Spanish?" I was like, "Yeah, I'm Mexican, I'm from Mexico."

This led to a brief conversation in Spanish in which the student asked if José would conduct the flight instruction in Spanish (Table 21.1). After considering the proposition José decided that he would not conduct the lessons in Spanish though it was his and his student's native language (Table 21.5). "There's a lot of terms that I don't know how to translate into English [Spanish], because like I've been like through the program and everything has been in English, so everything that I know about aviation is an English..." He also felt that for the student to learn in Spanish would impede his progress later as he continued his training with non-Spanish speaking

instructors (Table 21.2 & 21.3). In this way, much as he had overcome various obstacles, he asserted that his student needed to confront and overcome the language obstacles in his path (Table 21.5). Nonetheless, José found that his bilingual ability became a valuable asset for the student at times (Table 21.3, 21.4 & 21.5).

I mean there were times where if he gets stuck in something, then I would explain to him in English and then he would be like, “so this is what we do?” [response] “yeah.” And then, he would still be kind of like confused. So I would just tell him in Spanish...and he would be like, “oh, okay.” So it's kind of like, it helped me out because whenever he wouldn't understand something I would just tell him in Spanish and he would understand it.

The difficulty of communicating complex information was bridged through a limited use of Spanish (Table 21.5). Though it had been his intention to restrict the use of Spanish he learned that at times it was a valuable asset to facilitate his student's understanding (Table 21.3, 21.6, & 21.7). Implicitly, this approach reinforced his caring frame of reference and supported the need of flexibility as a flight instructor (Table 21.7 & 21.8).

Table 21

*Technical Skill or Knowledge Problem, José*

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
1. Trigger	Skill and Knowledge acquisition impairment.	
2. Interpreting the Experience	a. Identified the problem and an impairment of understanding, a cognitive problem.	a. Based on his experience as a student and instructor through his learning experience (FEE, SOC, FOR-U).
3. Examine Alternative Solution & Selecting an Approach, Method or Strategy	a. Bypassed this phase. b. Considered the experience that he had of a non-native English speaker.	a. Utilized a routine approach to resolve problems in much the way that he had been helped as a student thus bypassed phase 3 and 4 (FEE, FOR-U). b. Based on his personal experience as non-native English speaker (SOC, FEE, FOR-U).

(continued)



Table 21 (continued)

Informal & Incidental Learning Model Phase	Events & Explanation	Frame of Reference (Code)
4. Learning Strategies	a. Bypassed on the first iteration. b. Referred to his personal experience as a student.	a. Bypassed on the first iteration utilized a routine approach (FEE, PCE). b. Based on his experience as a student and his personal struggles with language variation (FEE, SOC, FOR-U).
5. Produce Proposed Solutions or Implementation	a. Initially used a method that he had experienced as a student. b. Utilized the native language of the student in an effort to facilitate the knowledge transfer.	a. Used an approach that he had been taught as a student, his success formed a framework that suggested that others would be successful with the method as well (PCE, FEE, FOR-U). b. Implemented the native language having recognized the difficulty that he had faced as a student with the expectation that it would assist the student to get beyond the deficit (BVR, FOR-U).
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	a. Student failed to understand. b. Recognized the student's acquisition of the requisite knowledge	a. Initial feedback indicated that the student had failed to understand the requisite knowledge and develop the needed skill (SOC, FEE). b. The student's developed understanding provided evidence that the approach had facilitated the transfer of knowledge (SOC, FEE, FOR-F).
7. Lessons Learned	Adjusting to the native language is a viable method.	Supported the approach to bridging the difficulty posed by symbolic interference (SOC, WE, FOR-F).
8. Framing the Context or Reframing	Reflected on the student successful acquisition of the knowledge.	Confirmed his frame of reference formed as a part of his experience as a non-native speaker. Reinforced the approach as a suitable instructional tool (FEE, WE, SOC, FOR-F).

Jo  s's experience as a student provided a framework for implementing this approach.

I remember when I was in [primary training]. I had trouble with a couple of things. I was like, man, you know how people think that just because you say it slower that people will understand you. It's not true. Sometimes my instructor would say it's slower and I'm like, "okay, I know what you're saying but it doesn't make sense." And it just wouldn't click. "Okay, yes you're saying is slower but it doesn't make sense, it still doesn't make sense." And I guess that's why I was, alright if it doesn't make sense, then I mean I say it in Spanish. So I say it in Spanish and yeah like, okay.

José's informal learning process is depicted in Figure 23. In this process he implemented an approach which had proved successful when he was a student as depicted by the solid arrow and boxes. Though this was somewhat effective, he discovered that in the process of teaching his student he was required to extend his methodology. The integration of his student's native language set in the background of his own experience in the aviation program provided a successful outcome for his student and reinforced it's utilization and supported his frame of reference as a caring teacher reflected in the segmented arrows. Some of the phases were interwoven and overlapped as signified by the overlapping and permeable boxes.

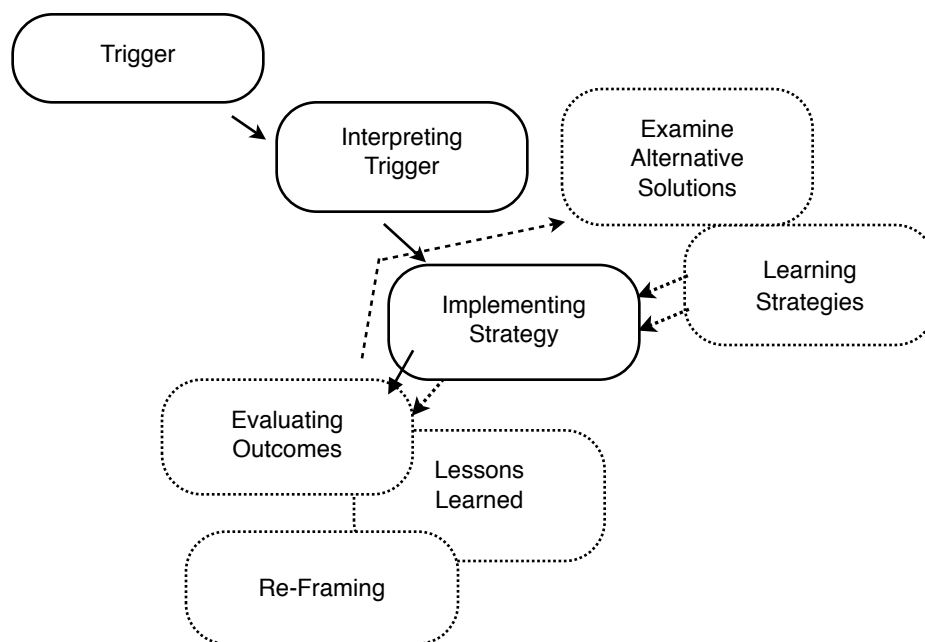


Figure 23. Informal Learning Process Map, José.

Another difficulty José faced with his student was one of social position and respect. Because his student was a little older, a graduate student, and perhaps a cultural element of Spain; while, José was younger and finishing his undergraduate program, the student demonstrated a lack of respect for him.

“How am I going to take this through a whole semester?” First thing he's already questioned, questioning me. I was like, “All right.” The next time we met we went to fly and then I just went through the maneuvers and maybe like after about a week he told me; “you're a real good pilot.” I was like, “Oh, thank you”...So when he told me he was like, “you always keep your altitude and I'm having a lot of trouble keeping my altitude and you're always at your altitude.” And I was like, “Well after so many hours you just learn to keep your altitude.” I told him, “Just wait until you get your Private Pilot License, and I'll bet you you'll be able to keep your altitude.” And I guess he made it his thing.

José responded respectfully and supportive based upon his caring approach to teaching.

The situation was resolved through José's demonstration of his mastery of flying in the day-to-day and by lessons and his personal investment in his student.

Similar to many beginning aviation students, this student struggled with landings. José used his past experience as a student implementing methods that had worked for him at first. When that proved to be unsuccessful he continued through trial and error approaches and inquired of other instructors to facilitate his student's knowledge and skill. Through this process he learned of the wide variance in students and came to understand the need for flexibility, the value of persistence, and the importance of collaboration. In this process he learned additional methods and approaches to dealing with the knowledge, skill, and social difficulties of being a teacher. Finally, his frame of reference of flight instructing was being transformed through the experience of assisting his student to achieve his goals, reframing his concepts of the meaning and value of teaching. After the student's final practical test,

My student walked in and I tried to be serious but, I couldn't I was happy too. He saw me and he was like, “I passed.” And I was like, “yeah, he [the examiner] told me already.” And I don't know, I was happy, like just like [when] I passed my CFI and my CFII. Just happy like, oh, yes he passed. And I don't know, it's a good feeling, it's a very good feeling.

In this transformation, José found that much as his parents had invested in him he in turn had invested in his student through teaching. José reflected, that through that investment he had received an intrinsic reward through teaching and participating in the success of his student.

### **Chapter Summary**

In this chapter, thick rich descriptive individual profiles for each of the ten participants have been presented that highlight the development of their frames of references. This chapter has also presented the journey that has led these participants into aviation instruction as well as described their engagement with various challenges that acted as triggers to their informal learning process. Further, the use of the Marsick et al. (2006) Informal and Incident Learning Model, has illuminated the influence of the participants' frames of reference on the informal learning process as a part of their continuous learning and development. Finally, the informal learning process has been depicted for each of the participants. In the next chapter, a synthesis of the findings across the data from all of the participants is provided.

## **Chapter 5**

### **Findings**

This chapter presents the cross case analysis of data from the participants' profiles. First, the factors which contributed to the development of individual frames of reference held in common by the participants in this study are discussed. Next, the informal learning process is situated in the aviation training setting. Specifically, the participants' problem histories are aligned with Marsick et al's. (2006) Informal and Incidental Learning Model and contextual factors influencing informal learning are discussed. This examination of the informal learning process of the participants reveals the non-sequential, non-linear nature of informal learning as manifested by this study. An illustration of the non-sequential process of informal learning is presented next. Then this exploration considers the interaction of the participants' frames of reference and their informal learning process addressing the influence of the participants' frames of reference on the informal learning process as well as the reciprocal, transformative influence of the informal learning process on the frames of reference of the participants.

For the purpose of this study a frame of reference was defined as a filter by which one interprets and provides meaning to the events and occasions of one's daily lived experience (Mezirow, 2000; Polanyi, 1964). A frame of reference is developed as a dynamic facet, interwoven with each experience of an individual. One's frame of reference is both nature and nurture as an intersection of the two in a dynamic process of learning and development. Individual experience contributes to the development and framing of one's meaning structures. These meaning structures frame expectations and influence interpretations of situations and events of one's lived-experience. Often, these frames of reference predicate behavioral outcomes

in response to events and situations. To understand how one interprets an event or situation, one must consider the particular frame of reference of the individual. It is in this sense that this study examined the commonalities among the participants in the development of their individual frames of reference founded on their life experiences, which they traced as a part of their personal biography, as well as examined the influence of frames of reference on the informal learning process.

The following question guided the study: How do frames of reference influence the informal learning process?

To address this question the researcher first delved into the biographical information of the individual participants to gain understanding of what influences were identified in the formation of his or her individual frame of reference as informed by sociocultural theory. The researcher also examined the influence of the participant's frames of reference on his or her informal learning process by mapping the interpretation and strategies described by the participant in the process of her or his informal learning in the workplace against the backdrop of her or his individual frame of reference.

The salient developmental influences on the frames of reference of the participants is presented in Table 22. This Table illustrates the varying degree that the categories were articulated or observed as an influence on the participants' frame of reference development.

Table 22

*Frame of Reference Development Participant Cross Reference*

Factors Contributing to Frame of Reference Development	Descriptive Cross Case Information
Parents (Father or Mother) & Family Experience	All ten of the participant indicated that their family had a significant influence on the development of their frames of reference.
Cultural Norms	Cultural norms as an influence on the development of frames of reference were explicitly prevalent for some of the participants such as Jose and Shiloh. However, all 10 of the participants implicated the culture of the university aviation program was a significant contributing factor to the development their frames of reference, particularly about teaching.
Social Interaction History	Social interaction was a prominent influence articulated by Shiloh, Lisa, Sam, Matt, and Diñez. However, all 10 of the participants articulated that their social interaction history and experience had factored into interpreting and responding to the problems they faced in the workplace and influence thereby their informal learning.
Exposure to Others	Jo��, Shiloh, Jack and Matt most directly articulated the influence of being exposed to others as an influence in the development of their frames of reference.
Work Experience	Prior to becoming flight instructors Jack and Sam articulated that they were influenced by various work experiences. As flight instructors, all 10 of the participants articulated the influence that the workplace had on their development and transformation of frames of reference.
Engagement with Teachers	All 10 of the participants articulated that teachers that they had been associated with as students had been a significant influence in their development of frames of reference. Interesting for some such as Peggy and Lisa a negative experiences had influenced an avoidance to certain approaches and framing more strict measures as being "mean teacher."
Formal Educational Experience	The most prevalent influence noted with regard to formal education was only as it applied to the common expression of the influence of the university aviation program. All 10 of the participants' frames of reference were influenced by the university aviation program. However, Ben, Shiloh, and Jo�� expressed the importance of their formal education, apart from the aviation program as being influential in their development.
Informal Educational Experience	Several of the participants articulated the influence of informal learning opportunities as formative in the development of their frames of reference. Jo�� was engaged with ROTC and soccer, Joe and Lisa with athletics, Shiloh and Peggy with dance, and Di��ez and Peggy both articulated the study of music as influential in developing frames of reference while Matt identified extracurricular activities as formative in developing his frame of reference to teaching and social engagement.

Table 23 presents the factors contributing to frame of reference development common among the participants, the effect on their frame of reference development and the subsequent influence on their informal learning process. This table identifies salient categories in the left

column, then reflects the effect on the development of the frame of reference in the center column, followed by the influence identified on the informal learning process in the right column.

Table 23

*Frame of Reference Development and Influence Summary*

Factors Contributing to Frame of Reference Development	Effect on Frame of Reference	Influence on Informal Learning Process
Parents (Father or Mother) & Family Experience	Contributed to the development and identification of cultural norms, expectations, values, and beliefs.	Influenced interpretation of events or situations in alignment with the participant's frame of reference.
Cultural Norms	Shaped ideas of norms and usual ideologies, promoting expectations and values and beliefs.	Influence was apparent on interpretation and strategy development.
Social Interaction History	Fostered development of expectations of social engagement, values, and beliefs.	Influence was found during interpretation and evaluating outcomes of interventions of social interaction.
Exposure to Others	Broadened concepts of cultural norms, challenged tacitly held beliefs, and reshaped values.	Extended the participants' ability to interpret events from various perspectives.
Work Experience	Fostered values and beliefs about the workplace, teaching responsibility, and mediated localized cultural norms.	Factored into interpretation and approaches to teaching. Fostered transformation of individual frames of reference.
Engagement with Teachers	Shaped values and beliefs about being a teacher. Provided catalogue of approaches to situations encountered as a teacher.	Influence was apparent on interpretation, strategy selection, and development. Participants often chose an approach derived from personal experience with teachers.
Formal Educational Experience	Fostered expectations of the educational setting and appropriate interactions and responsibilities of the setting.	Provided foundational teaching strategies to be implemented at a later time. Factored into interpretation and approaches to teaching and individual learning.
Informal Educational Experience	Engagement outside the formal educational setting fostered ideas of teaching, learning, and contributed to values and beliefs.	Influenced interpretation and provided a catalogue of methods and approaches to teaching problems.



Common to all the participants was the influence of parents in defining cultural norms and fostering values and beliefs which supported foundational frames of reference. The importance of core values and beliefs was evident in interpreting triggers and determining a course of action to address a situation which triggered an informal learning episode. The influence of prior work, formal and informal educational experience, such as dance, athletics, and various work place settings, helped to form a frame of reference of engaging with various situations, particularly those that involved social interaction situations.

As the participants developed, they engaged in a social, cultural, and historical construction of meaning. It was noted that the participants had embraced implicit values associated with aviation and the university aviation program through their undergraduate education as an expression of the cultural professional norms of aviation. This engagement formed a frame of reference from which they interacted in this unique workplace with colleagues and particularly with their students. Often, when the situation was ill-structured and complex, the participants' responses were intuitive and unreflective in nature. With the more easily defined problems, participants tended to rely on teaching strategies that they had been exposed to or used as students in a similar task. If this approach failed to resolve the situation, the participants tended to resort to teaching strategies that they had become familiar with through collaboration with other instructors or developed innovative approaches through experimentation and trial and error.

### **Frame of Reference Development**

**Parents and family experience and frame of reference development.** All ten of the participants identified their family as a significant contributor to their frame of reference

development. José's family history illustrates the significant influence that his family had in the development of his frames of reference. José sought to conform to his parents' aspirations by making them his own, valuing his education, and seeking to support others as his parents had supported him. Peggy commented that others said that she was "...just like her mother..." That is, that she displayed the same caring, interested approach to others that her mother had. Peggy also indicated that the influence of her father's interest in astronomy had factored into her selection of an aviation career field. Through her father's interest and her experiences involving aviation, she had formed a frame of reference of what such a career might provide for her future. Ben and Shiloh also attested to the influence of their mothers, who were teachers, in shaping their frame of reference of the role of a teacher by modeling specific characteristics that make a "good teacher."

Sam spoke of his father as his role model while Matt remarked, "...I've always seen my dad as...being my dad, but I view him more as like an adviser, uncle, best friend kind of person..." Both Sam and Matt had embraced the pattern of their fathers' lives and each sought to emulate the values of their fathers. Sam's career desires, his style of life, his concepts, and beliefs about the outcome of his education and career pursuits were largely the contribution of his father's influence and involvement in his life. Jack indicated that he was influenced by his father by reaping a sense of responsibility toward others which governed his behavior, both in the workplace and elsewhere. He indicated that since his father was a pastor he always felt that others expected a certain form of behavior from him. He said that others expected his behavior to be of a higher level of character than "other kids" and he, having embraced the beliefs and values of Christianity as his father and mother, sought to fulfill a life of integrity, responsibility,

and high moral character. Jack's frame of reference, as the son of a pastor, also embodied assumptions and expectations of others. Shiloh indicated the influence of her mother factored into her own identity, shaped her values of teaching, as well as defining the her role and responsibility as a teacher.

Diñez and Lisa strongly expressed the influence and the importance of their family. The strong social orientation that these two participants described was first formed in the strong family landscape. The influence of one's parents and care givers was evident in the development of a frame of reference for each of the participants in fostering expectations for themselves concerning their responsibility and interaction with others in the workplace. This development influenced the participants' informal learning process through the interpretation of events and situations that each encountered in the work place.

Early experience in the homes of each of these participants fostered the development of points of view and habits of mind that formed unique frames of reference which embodied values and beliefs about themselves and others regarding personal responsibility, social interaction, and appropriate place. These frames of reference were shaped through an interwoven web of factors, individual and collective, personal and social, in a dynamic process of development.

**Cultural norms and frame of reference development.** Jack remarked as he reflected on his expectations as he began at the university, that he felt that he was, "...different than everybody else..." He indicated, this belief was based primarily on the difference of him being married, while others would be traditional college students, both single and younger. He believed this variation from what he considered to be the accepted norm, would set him apart

from the other students. As he reflected on this particular frame of reference, he remarked that his feelings were as they had been as a “kid,” stating that he “...felt the same way...” as when he was young which related his experience as the son of a pastor which indexed his frame of reference.

As a child of a pastor Jack perceived himself as being different from other young people of his area. Associated with this cultural history, Jack had expected that he would be an “outcast” among other students and not considered a part of the group, he said he expected to not be “accepted.” Though he was the only married student in most of his classes and though he had different interest, contrary to his frame of reference, he felt he had been accepted by the other students. Ben also framed himself as different from most of the students in the university and aviation program as well. He based this point of view on he being from a rural setting while he framed others at the university as being from the large city with different backgrounds, values, and priorities.

Embedded in communicating their experience Jack and Ben compared themselves to others, often framing themselves as different for various reasons. Being different was a pervasive theme from Jack’s earliest recollection and formed expectations, shaped his understanding, and predicated a response to the various situations he encountered in daily life. Ben indicated that these feelings of being different had been a part of his development instilled early on as a child. Likewise, Sam’s aviation oriented family history instilled cultural norms of a positive framing of an aviation lifestyle. His frame of reference was challenged by his first student, a non-aviation major. Much as Jack had identified himself as “a normal kid” in reconstructing his experience, Sam’s frame of reference construed aviation as “normal”

particularly in the aviation program. Both Jack and Sam, after reflecting specifically on the idea of normal, recognized that normal for them was life as they knew it from their background, national origin, geographic location, and cultural experience.

A culture of teaching pervaded Shiloh's life experience in which her mother and sister-in-law both were teachers. She said that if she could not fly, then she would have pursued a career in teaching as well. Díñez and José's family history espoused a culture of focused work ethic and open exploration that fanned their ideas of teaching. It was evident that various cultural elements had influenced the participants' frames of reference and that the participants' frames of reference factored into their expectations and interpretations of situations and events that they encountered in the workplace. These culturally embedded interpretations and points of view suggested possible solutions which led to behaviors and influenced informal learning. The culture in which each of the participants engaged played a significant part in the development of their frames of reference, especially individual identity, interpersonal relationships, and the expectations of workplace situations.

**Social interaction history and frame of reference development.** All ten of the participants indicated that social interaction influenced how they engaged in various situations in their daily experience. For example, Ben and Matt commented on the development of social understanding, apart from the aviation setting, as a factor in responding to the socially interactive needs of their students. In remediating problems Sam, Jack, and Lisa articulated that their social interaction history provided resources for understanding and reacting to the situations they encountered with their students.

**Exposure to others and frame of reference development.** Shiloh's experience with others, locally and through her travels to France and Mexico, as well as the occasional trip to Iowa or Illinois from her native Colorado, broadened her understanding of the experience of others and influenced her expectations and relationships. José's transition into a foreign country with a different language shaped his frame of reference of learning and teaching. For example, José initially rejected his student's request to teach in Spanish, a primary language for both of them, because he considered it detrimental to his student's learning for the long term based on his own experience. Díñez and Peggy's travels influenced their expectations of others as well. Sam's brief aviation experience in Europe helped him to recognize that, as flying in Europe was foreign to him, the university aviation environment was foreign to his international student. While in Europe Sam found the normal flight operations disconcerting because it was different from his own ideas of aviation based on his experience in his native culture and his family history. Sam also indicated that he had an ongoing close relationship with a young woman from eastern Europe which influenced his framing of others. Nevertheless, Sam's ethnocentric sociocultural values and beliefs pervaded his frame of reference. He indicated that, in spite of his exposure to others, he considered himself, his language, his desires, his personal preferences to be "normal," generalizable to others, and perhaps superior to others as well. Sam struggled with the variance he found in others and the idea that normal for them was abnormal for him.

External experience with individuals and environments different from one's familiar place and culture tended to broaden one's frame of reference toward others according to the participants. This exposure influenced how the participants interpreted and responded to events and situations as part of their informal learning process as instructors. Participants provided

accounts of how the exposure to others during their experience at the university, particularly in the aviation program, strongly influenced their frame of reference. This exposure mediated ideas and beliefs about others engaged in the aviation program. The experience influenced the participants' interpretations and strategy selections in their informal learning process as teachers in the aviation program.

**Work experience and frame of reference development.** Several of the instructors remarked that work experience apart from the aviation setting shaped their interpretation and formed a response to situations that they faced in the aviation training setting. Jack and Sam indicated that their experience in prior work place settings had influenced their frame of reference of engaging with others. Though prior work experience was not articulated across all the participants, all ten of the participants indicated that their work as flight instructors had been strongly influential in developing and transforming their frames of reference of teaching, learning, and the learning environment.

**Engagement with teachers and frame of reference development.** One key influence in the participants' development of frames of reference regarding teaching, beliefs, and value structures was their experiences as learners influenced both negatively and positively by their teachers. Lisa, Diñez, Peggy, and Shiloh shared emotionally charged experiences with instructors who were either verbally abusive or failed to provide a positive environment for learning. They indicated they had been adversely influenced by a violin teacher, a band instructor, or a flight instructor who "yelled," as well as an instructor who didn't take a responsible attitude toward his students. These instructors' abusive behaviors negatively affected and impeded each participant's own motivation and learning. These experiences etched an intent

to avoid this kind of behavior into each participants' frames of reference of being a teacher. Peggy, Lisa, and Shiloh articulated clearly the influence of the negative learning experience, stating that they would not treat their students as these "mean" instructors had treated them illustrating their frames of reference in contrast to some of the negative experiences with their teachers.

Each of the 10 participants indicated that they had been strongly influenced by the positive interaction of teachers. Katherine had been helped, in more than academics, by one teacher at a very difficult time in her life. She indicated that this teacher had supported and cared for her in this time of personal stress. Peggy also illustrated the care of teachers, beyond academics, that influenced her frame of reference regarding relationships in the educational environment. She also described early experiences with a flight instructor she framed as an "awesome" instructor. Díñez styled an instructor as "amazing" and one who made learning fun. Shiloh and Peggy both spoke of their experience during childhood and adolescence with dance instructors and other teachers who made learning fun and demonstrated an interest in them personally. Each of these participants illustrated how this experience shaped how they framed teaching. Ben, Sam, and Jack indicated that their personal interaction with teachers and coaches factored into their development of teaching strategies.

In some cases the participants identified methods that they desired to avoid in their own teaching because of a negative learning experience. However, the most frequent response described strategies and ideas about teaching that they generally wished to emulate. Both, implicitly and explicitly, the participants developed a frame of reference toward teaching through interaction with teachers and the learning environment while learning as a student. Not only did



they learn to fly but simultaneously they implicitly were learning to teach as well when they had been students.

**Formal educational experience and frame of reference development.** A common aspect of the 10 participants, particularly in developing a frame of reference as a teacher, was their experience gained from the formal educational setting, especially in the university aviation program. Development of approaches and attitudes toward the responsibilities of the student and expectations of performance was attributed to their own learning experience as students as well as through other formal and informal educational environments as students. In most cases, the participants expressed a bit of anxiety at the beginning of their teaching experience. This anxiety did not appear to be the result of the inherent dangers of teaching others to fly an airplane; rather, it was the recognition of the personal responsibility that they had in facilitating the learning of their students. This condition was not described as due to a sense of incapacity or inadequacy on the part of the participants, but founded upon a sense of personal validation and an identity of being responsible for their students' learning based upon their experience as learners in the educational setting.

As a part of this sense of responsibility, some of the participants attested to defining their own sense of success as being intimately attached to the success of their own students. Díñez remarked that, for her, a failure of her student felt as if she had failed. Jack indicated that, "he felt bad" when his student was not proficient enough to proceed to a practical test at the end of the term. Jack experienced a sense of "loss" even though he had adequate evidence attesting to the quality of his own personal efforts, along with the evident failure of his student to take

responsibility for his own learning. Peggy and Katherine also expressed the personal emotional impact that came with their students' poor performance.

**Informal educational experience and frame of reference development.** Developing a frame of reference, particularly in regards to teaching, was also attributed to the informal educational experience of the participants as well. Shiloh and Lisa related that they understood and responded to situations as a flight instructor that had been formed as a part of their informal educational experience. Peggy indicated that, though one of her students had satisfactorily completed his practical test, the check instructor identified an area she had overlooked. She framed herself as being responsible for identifying and correcting those “little things” as her dance and riding instructors had done for her. During their formal and informal educational experiences they had embraced certain norms of the aviation profession and had developed an identity of being an instructor.

**Acculturation in aviation.** As students, these flight instructors had entered and embraced the professional culture of aviation. Interwoven with the influences of family, culture, exposure to teachers and others, and the educational environment these value shaping experiences formed foundational frames of reference and a professional identity. These instructors had developed a frame of reference that held good teachers as caring, personally involved with their students, and committed to their students' success. The practical expressions of these frames of reference varied individually. For example, some such as Lisa or Katherine were deeply centered on the successful performance of their students while others, such as Sam, did not express this same sense of anxiety. Some were more self focused, spoke little of caring teachers, did not openly equate caring as a quality in a good teacher beyond the delivery of

materials and data for the acquisition of knowledge. This difference represents a critical variance in the personal commitment and identity that was expressed by these participants. This variance describes a difference among the participants in this aviation education setting which influenced educational activity and factored into the teachers investment in informal learning founded on one's frame of reference.

**Frame of reference and teaching.** The participants having been engaged with a learning environment, or with a particular teacher, fostered values and beliefs about teaching which they embraced in their own efforts as teachers. These participants interpreted situations and developed teaching strategies according to their own personal frames of reference and meanings of being a teacher. Matt and Sam, though invested in providing for the proper educational environment for their students, were more utilitarian in their approach to flight instruction. They were interested in the success of their students and meeting the work expectations of the organization. However, the explicit identification of the intrinsic value of teaching was not articulated as dramatically as it had been by the other participants. Ben, Matt, and Sam stated that their primary goal of flight instruction was being able to “build time” without additional cost. However, though Matt indicated that time building was a factor to becoming a flight instructor, he also stated, “...[I] always liked showing others what I was already capable of doing. I liked teaching...” Building flight time was a necessity for each of the participants for career advancement. Without the accumulation of a significant amount of pilot experience they could not realize their career path goals. Sam spoke of “giving back” to the aviation community, but did not reach the level of personal attachment to his students that was expressed by the other participants. Sam differed from the other participants by being the only

one of the ten participants that had a historical background founded in aviation with both his mother and father involved in the field of aviation. Matt and Ben were more expressive of the value of teaching for the sake of their students than Sam, but not to the level expressed by Katherine, Lisa, Shiloh, Peggy, and Jack in their initial descriptions of their frames of reference.

### **Situating Informal Learning**

Examining how the informal learning process of these participants was influenced by their frames of reference was accomplished through carefully considering the process of how and why each participant responded to the problems encountered in the workplace. Encountering a problem provided a trigger which compelled the participants to engage in the informal learning process while seeking a solution to the problem.

**Learning from problems and challenges in the workplace.** As with most organizations, the participants acknowledged that the university aviation program had certain organizational factors that presented challenges for the participants. The participants remarked that they were challenged by the documentation requirements, record keeping, and curriculum requirements dictated by the policy of the program. Several of the instructors also articulated that they found the time constraints of training to a high level of proficiency set in the boundaries of the semester time frame generated problems that they had to learn to account for. However, the most notable problems described by the participants were those that were generated when facilitating the learning of their students.

The problems faced by these participants catalyzed their informal learning and can be described by two broad categories. The first category was identified as a *technical skill or knowledge problem*: a situation in which a student had difficulty with an operational task in

flying the airplane, or in understanding one of the many cognitive requirements of the discipline. The skill portion of this was a problem situated in the psycho-motor domain, though often the problem overlapped into a cognitive issue. The cognitive aspects of technical skill or knowledge problems were identified as a difficulty that involved the cognitive domain of learning. Often, such problems were located in the complex physical systems of aircraft, aerodynamics, or procedures of the discipline of flight. Technical skill problems were identified as problems of rudder control, over controlling the aircraft, or difficulty in developing the ability to land the airplane. Cognitive problems involved such things understanding holding patterns, aerodynamics principles, or the many technical and regulatory knowledge requirements of aviation. The technical skill or knowledge problems were largely anticipated by these instructors and had been addressed by the CFI training curriculum.

Unique in the study was the cognitive problems that surfaced for José's native Spanish speaking student that were due to the symbolic barrier of language. Symbolic barriers might be a common problem for students as they engage with new subject matter. This barrier might go unrecognized by the instructors as they have become acculturated to the language and jargon of the discipline and formed implicit assumptions about the knowledge of their students. Sam and José articulated encountering symbolic interference with their international students in communicating the complex techniques, procedures, and regulatory requirements of aviation.

The second category was identified as a *social interaction problem*. This category was identified as the product of a variance in an affective domain involving the feelings, beliefs, values, goals, and attitudes of the students set in contrast or conflict with those of the flight instructor. These social interaction problems were often underlying issues which led to poor

student technical performance, or surfaced as a conflict between the student and the teacher. Such references by the participants to attitude problems, motivational issues, student inattention, and student attendance problems reflected the various manifestations of this category. The origin of a social interaction problem may be categorized as an affective issue, yet frequently the presenting problem was identified as a cognitive or psycho-motor problem. Often, a social interaction problem was recognized by the participants after unsuccessful attempts to resolve technical skill or knowledge deficiencies through a reinterpretation of the trigger. Document reviews and observation revealed that there was little instruction provided in the CFI curriculum to prepare and assist instructors in recognizing and addressing social interaction problems resulting in non-routine situations that stimulated their informal learning.

These two categories, technical skill or knowledge and social interaction problems, often overlapped and were interwoven in various aspects of the teaching environment which complicated the flight instructors' informal learning process. The basis of interpreting and responding to events was founded on the participants' identification and meaning making of the situation or event based upon their frames of reference. It was found through the alignment of the of the informal learning process with the participants' frames of reference that the participants' frames of reference influenced their interpretation, behavior, and understanding of the events during their early teaching experience.

Encountering problems often resulted in a sequence of interpretation and trial and error approaches to craft new teaching strategies to attempt to resolve the problem. This was followed by an evaluation of the outcomes of the implementation of the teaching strategy. If a successful resolution had not been achieved then the process returned to a re-interpretation, or an altered

strategy development in an attempt to address the problem. Co-evolutionary and interwoven with the problem solving process for these participants was their engagement in their own learning informally. This involved the participant learning about how to facilitate their students' learning more effectively. This interwoven problem solving and informal learning process continued until either the problem was resolved, or there was a termination of the instructional relationship such as Peggy and Ben experienced.

Tables 24 and 25 delineate the alignment of some of the problem histories as told by the participants. These biographies were organized in the technical skill and knowledge or social interaction problems categories identified in this study, and arranged in alignment with Marsick et al.'s (2006) Informal and Incidental Learning Model. The first column identifies the phase of the informal learning process. The second column associates an event with the particular phase of the process. The third column provides the participants' identifiable frame of reference and/or the influence exerted by the phase in forming a frame of reference.

Each of the instructors encountered a number of technical skill problems along with an inability of the student to understand the various cognitive requirements of the curriculum (Table 24). For example, Peggy had a student that had difficulty maintaining altitude and holding heading and Shiloh encountered a student that had difficulty with understanding holding patterns. Several of the other flight instructors indicated that they had encountered a problem with the students' ability to land the airplane.

Triggers to technical skill or knowledge problems were usually an observed deficiency in knowledge or proficiency in a specific area or task of flight operations (Table 24.1). These deficiencies were assessed relative to criteria based on two components. The first was the

instructor's evaluation in alignment with practical standards established by the training curriculum. The second was based on the instructor's personal evaluation of acceptable performance or knowledge. Sometimes this evaluation was developed in collaboration with other instructors (Table 24.2). As the participants encountered a trigger, the development of a teaching strategy often relied on several sources previously learned by the participants such as, specific techniques that the participant had used as a student, or an approach that the participants' instructors had utilized with them as students to address a similar problem. These participants implemented the teaching strategy and based on their own previous learning, expected the response of the student to be similar (Table 24.3, 24.4, 24.5). If these strategies were ineffective, then the participants would informally engage in learning through trial and error, experimentation, conversations or collaboration by asking others for ideas or, they employed audio-visual media resources to learn alternative approaches to the problem (Table 24.6, 24.7).

A successful resolution to a problem provided reinforcement of the participants' frames of reference resulting in an expectation of continued success through utilizing a particular approach for such problems. An unsuccessful outcome resulted in a reframing of the situation and acquisition of new and varied approaches such as Sam and Peggy had indicated which were necessary to understand students' difficulty with learning and to learn new approaches to facilitate students' learning (Table 24.8).



Table 24

*Technical Skill or Knowledge Problem Synthesis*

Informal/Incidental Learning Phase	Events & Explanation	Source and Influence
1. Trigger	Student unable to operate at a level of proficiency required curriculum standards.	
2. Interpreting the Experience	Direct observation compared to perceived standards while considering possible explanations of the problem.	Participant interpretation was based on stated criteria (FEE), personal experience (FEE), and collaboration (SOC, WE). Standards set forth in publications were primary resources for interpreting the experience (FEE, FOR-U).
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	Participants used approaches that proved to be effective during their flight training. If the problem were unusual or unresolved the participants resorted to inquiry, collaboration with other instructors, experimentation, and trial and error.	Past educational experience as students formed a key resource based on perceived common experience (FEE, PCE, FOR-U). With the unusual or unresolved, reliance on other instructors contributed to strategy selection as well as learning (WE, SOC), text reference (FEE), and innovative approaches became resources for selection (BVR).
4. Learning Strategies	Intuitive responses were most frequently the product of a prior experience which bypassed this phase initially. Otherwise, participants engaged in learning through review of requirements, inquiry of others, experimentation, trial and error, and self directed study.	Participants developed a strategy based on prior experience (PCE, FEE). Learning came through other instructors (SOC, WE), text/video reference (FEE), and trial and error (BVR) when the situation was unusual or unresolved by prior approaches (FOR-U).
5. Produce Proposed Solutions or Implementation	Implementation of a teaching strategy was often based on the participant's learning experience as a student or learned through collaboration with other instructors.	Methods initially were often those that were utilized by the participant's instructor when he or she was a student expecting his or her students to respond as the participants had during their training (FEE, PCE). Later participants engaged in socially constructed approaches (FOR-U, SOC).
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	Participants evaluated the student performance as improved or unchanged. This evaluation helped them to determine if teaching strategy was effective.	Deduced assessment from interpreting the student's improvement or lack of improvement set against curriculum criteria and expectations (FOR-U, BVR, FEE).

(continued)

Table 24 (continued)

Informal/Incidental Learning Phase	Events & Explanation	Source and Influence
7. Lessons Learned	Improved performance reinforced the suitability of a learned teaching strategy. An unchanged outcome indicated that the teaching strategy was unsatisfactory. In either case the flight instructors learned about the suitability of the teaching strategy to address the trigger.	Through a successful approach participants were provided a strengthened frame of reference, while failure required re-framing and continued problem solving through informal learning (FOR-F).
8. Framing the Context or Reframing	The successful resolution of a problem provided reinforcement for the method while an ineffective approach fostered an adjustment to framing the problem such as recognizing the need of flexibility.	Participants personal experience was interwoven into the development of a frame of reference for future experience (FOR-F).

Social interaction problems were also articulated by participants (Table 25). In some of the instances the problems were initially manifested explicitly as a social interaction problem, but in most cases the situation was interpreted as a social interaction problem only after failed attempts to resolve a presenting technical skill or knowledge problem (Table 25.2, 25.6, & 25.7). Triggers for social interaction problems varied with each encounter in which few were obvious. Noted exceptions were Peggy's student with a declared personal problem, and José's student's request to be taught in Spanish, as examples of explicit social interaction problems. However, most situations were ambiguous such as: continued poor technical performance after suitable interventions, or inappropriate application of effort by the student (Table 25.1 & 25.2). In either manifestation of a social interaction problem, little of the formal CFI training provided a framework from which to interpret and address such situations. Thus, the lack of prescribed or routine strategies required participants to engage in informal learning, re-framing, and re-interpreting the experience (Table 25.3, 25.4, & 25.5). Often, these instructors relied on their

own intuition to interpret and address the novel situations as they were surfaced and recognized (Table 25.3 & 25.4).

On occasion, participants' interpretations were based on a *perceived common experience* (PCE) between themselves and their students (Table 25.2). Perceive common experience was utilized as a part of interpreting the situation when the instructors envisioned themselves vicariously in the student's place. In such cases, the participants responded according to their own personal expectations based on an empathetic approach. Peggy used such an approach with one of her students indicating, "...if I were in this situation this is how I would feel." Sam remarked that as he engaged with scheduling problems of his student, he framed the problems based on his own experience of balancing and resolving his own scheduling problems as a student. However, Sam found that the ability to come to a successful resolution, as he had with his schedule, was not the case with his student. This outcome required a reinterpretation and another approach to the problem (Table 25.6). Katherine and Jack's expectations were challenged by a student's un-submissive attitude and lack of receptiveness to the instruction they provided. This response was contrary to their frame of reference of the instructional relationship and resulted in unsatisfactory outcomes. This issue impeded their ability to address the technical skill problems of their students effectively. Díñez was faced with a value structure problem generated by a student's involvement in a fraternity that impeded his investment in the aviation training curriculum. Such behavior conflicted with the participants' frames of reference and expectations of the educational setting which triggered an informal learning process for the flight instructor (Table 25.1).

The informal learning process continued throughout the various iterations of the problem solving cycle as the participants interpreted the experience, implemented different instructional approaches based on their own learning and experimentation. Frequently the participants re-interpreted the trigger as a part of assessing the outcomes of an implementation. Through this transformative informal learning process, the participants developed an altered frame of reference from which they would engage future teaching situations (Table 25.6, 25.7, & 25.8).

Table 25

*Social Interaction Problem Synthesis*

Informal/Incidental Learning Phase	Events & Explanation	Resource and Influence Input and Outcome
1. Trigger	Inadequate proficiency but the student manifests an attitude or motivation inappropriate to the learning environment.	
2. Interpreting the Experience	Repeated process of trial and error with attempts to resolve the technical performance issue. As a part of addressing a technical performance problem, teachers engaged with a social interaction problem must bypass the surface technical problem to recognize and interpret the social problem.	Recognition was based on both comparing aviation standards and social experience of the participants apart from the aviation setting (WE, SOC, BVR). When situations were unresolved participants used social experience gained as a part of social history to interpret the situation (PCE, SCN, SOC, BVR, FOR-U).
3. Examine Alternative Solutions & Selecting an Approach, Method or Strategy	Initially relied on an intuitive approach based on experience. If the initial approach was unsuccessful, the participant accessed strategies through inquiry of other teachers or resorted to experimental interventions, collaboration and trial and error.	As a part of the trial and error process teachers made multiple attempts to resolve the same problem. This was often non-reflective, reactive in nature and intuitive (SOC, BVR, FOR-U). When problems remained unresolved participants resorted to extended resources (SOC, WE, FOR-F).
4. Learning Strategies	Intuitive non-reflective response and trial and error were founded on previous personal experience and resulted in the omission of learning strategies. Later, collaboration became a resource.	Founded on the frame of reference and repertoire of the instructor developed as a part of social engagement history (BVR, SOC, WE, FOR-U).

(continued)

Table 25 (continued)

Informal/Incidental Learning Phase	Events & Explanation	Resource and Influence Input and Outcome
5. Produce Proposed Solutions or Implementation	Participants utilized negotiation, confrontation, and non-recommendation to academic advancement.	Often, implementation followed a trial and error process as instructor learned his or her way through the problem process (BVR, FEE, SOC)
6. Assess Intended and Unintended Consequences or Evaluating Outcomes	With unsuccessful attempts to resolve a situation the participants returned to re-interpreting the event informed by the new context of the failed approach. The process of informal learning and problem resolution continued.	The analysis of the outcomes was based on the frame of reference of the individual instructor which shaped his or her understanding and evaluation of the social dynamics of the ill-structured situation (BVR, SOC, SCN, FOR-U).
7. Lessons learned	Learning was informal and/or incidental in nature, changing the assessment of the problem and fostering renewed approaches as an iterative process. Learning was often tacit. The technical skill problem was framed as a symptom of a deeper social interaction problem.	The incidental and informal learning became part of an iterative process in which each of the participants engaged in an endeavor to resolve the social interaction problem (WE, SOC, FOR-F). Often, the outcomes fostered disquiet and emotional upset for the instructor (BVR, SOC, SCN, FOR-F).
8. Framing the Context or Reframing	The learning experience changed methods, ideas, concepts, and expectations of future engagement in the learning environment.	For each participant, the outcome of the informal and incident learning process, as a part of a social interaction problem, became a thread that was woven into the fabric that composed the transformed frame of reference of each participant. (FOR-F, BVR, WE).

The participant illustrated how they interpreted and responded to situations, based on their own experience and expectations, framed in their own beliefs and value structures stimulated by the various problems they met with as a part of their early teaching experience. This illuminated the nature of the problems potentially acting as both a trigger to the informal learning process and as a contextual factor that influenced their ongoing process of informal learning.

The problems that the participants were faced with were complicated by the intense and urgent nature of the environment. The aviation training environment is one that is variable, and

often requires a need for immediate response and resolution due to the elements of safety, the speed at which decisions must be made in the cockpit, and the limited time for application and learning. These characteristics provided an intense learning environment that required near immediate responses to student learning problems. In such situations instructors were required to ‘learn on the fly,’ often implementing innovative approaches that were a part of their trial and error process. The intensity of the various challenges faced by the participants changed with the nature of the problem. Ultimately, highly ill-structured problems, coupled with the limited reaction time associated with flight instruction, provided a teaching and intense learning environment and raised the level of urgency which complicated the participants’ informal learning process. This illuminates the importance of context in the informal learning environment.

**Contextual Factors and Informal Learning.** Scholars contend that informal learning is situated in context which consists of various factors that are physical, social, political, and emotional in nature. Table 26 provides an articulation of the salient contextual factors along with the influence exerted on the process of informal learning of the participants. As previously articulated problem variation factored into the context of the informal learning environment. Further, it was evident that this organizational culture was supportive of the informal learning process of these new flight instructors. The facilities provided spaces and schedules that allowed informal conversations and collaboration among colleagues was encouraged. The informal atmosphere of the workplace made interpersonal encounters non-threatening and open as often instructors ate, commuted, or roomed together. Additionally, there were both formal and informal supports for the new instructors through class collaboration, instructor meetings, and

coaching and mentoring practices, both formal and informal, which provided rich resources for informal learning and problem solving for the new instructors. Nevertheless, the participants' frames of reference filtered the context of the organization and thereby influenced their informal learning process adding an element to further understanding context.

Table 26

*Contextual Factors Influencing Informal Learning*

Contextual Factor	Identification or Specification of Contextual Factors	Participants' Activity or Description
Problem Variation	Technical Skill and Knowledge Problem	Encountered a student learning problem in psycho-motor or cognitive domain with required participation in informal learning to facilitate the students learning.
	Social Interaction Problem	Encountered an affective situation that required informal learning to resolve the situation.
Organizational Factors	Curriculum Requirements	Required skill and knowledge set in specific standards.
	Time Constraints	Limitation of semester and individual time restrictions.
	Organizational Policy	Organizational constraints the influenced the participants' job responsibilities.
Organizational Culture	Support for New Flight Instructors	Formal and informal support for new teachers.
	Support for Informal Learning	Organizational recognition of the necessity and value of informal learning for teachers.
	Opportunities for Collaboration with Colleagues.	Provision and support for informal conversation and collaboration for teachers.
	Access to Technology Resources	Provision of web, literature, and media resources to advance informal learning of the teachers.
Frames of Reference	Development and Identity	Mediated interpretation of external context
	Experiences as Students in Aviation	
	Experiences as a new flight instructors	

It is important to acknowledge that these contextual factors include those that are external to the participants which include: the problems that they faces, the organizational factors, and the organizational culture. Their frames of reference are internal to the participants. All the contextual factors influenced the informal learning process but it was apparent that the participants' frames of reference acted as a filter for interpretation and response to the external contextual factors which shaped the informal learning process.

**Informal learning process as cyclical, non-linear and non-sequential.** The mapping of participants' informal learning process through the various situations and problems that they faced revealed a non-linear, non-sequential, and cyclical process. This process amplifies the interaction of frames of reference with the informal learning process embedded in the context of the learning environment.

***Problem variation.*** In most cases, the trigger for the informal learning process was recognition of poor student performance according to standards of acceptable proficiency based on the flight instructor's experience and understanding of the aviation criteria (Table 24 and Table 25).

***Technical skill and knowledge problems.*** Both, technical skill or knowledge and social interaction problems often initially presented themselves as a technical skill or knowledge problem (Tables 24.1 & 25.1). In most cases, this was recognized as a deficiency such as a student having an operational difficulty based on the instructor's perception and expectations (Tables 24.2 & 25.2). Having determined the nature of the problem, at least to their initial satisfaction, the participants frequently responded intuitively or attempted to identify a number



of possible solutions (Tables 24.3 & 25.3). Often, the new flight instructors initially relied on the resources that had been helpful to them in their experience as students of aviation.

Various approaches were used to learn alternative strategies to resolve student learning problems. The participants tended to collaborate with other instructors through informal conversations or to specifically seek out specific information from colleagues. Sometimes they queried senior instructors to gain insight and ideas for learning strategies and resolving a problem. This activity blended the phases of learning strategies while considering possible alternative solutions. This illuminated a blurring of the clear distinctions between phases as the participants investigated and learned alternative approaches to address a problem simultaneously thus illustrating the non-sequential nature of the informal learning process (Tables 24.3, 24.4, 25.3, & 25.4). In some cases, the new instructors would refer to resources such as literature, web resources, or video presentations that addressed the problem as a review to clarify their understanding of the procedure, or to surface new ideas to aid in addressing the deficiency illustrating various means of accessing and learning new strategies.

Having chosen an approach to resolving a problem, the instructors implemented the selected solution in alignment with the informal learning model (Tables 24.5 & 25.5). Since flight training is a visually oriented task, feedback on the success of the approach was very prompt as a part of assessing the outcomes of an approach. Embedded in the assessment of the outcomes the instructors learned lessons in accord with the informal learning process and either determined that there was an increase in students' skill or knowledge evident or there was no progress as a part of problem solving. Sometimes the outcome of the intervention would be incomplete requiring drill and practice or an alternative approach to reach an appropriate level of

skill (Tables 24.6 & 25.6). At this juncture the instructor, having evaluated the outcome of the learning intervention, could move on in the training curriculum if the chosen strategy to improve their teaching provided progress toward the desired proficiency. However, if the outcomes were less than satisfactory the instructors regressed in the informal learning process to the interpretation phase or to selection of an alternative strategy (Tables 24.6, 24.7, 25.6, & 25.7).

In some cases, the instructors implemented an alternative solution which had been determined previously as one of several possibilities but was not initially selected for implementation. In this instance, the implementation would occur without spending additional time on interpretation as a part of the evaluation of the outcomes, and lessons learned. This activity led to reframing the situation and facilitated the interpretation as a part of the process of re-framing. This also illustrated the blurred boundaries of the phases of implementation, evaluation, lessons learned, and framing (Table 24.7 & 25.7). In some cases, participants repeated the same strategies or inquired again of other instructors in an effort to resolve a problem (Table 24.5 & 25.5). In more than one case, the participants invented novel approaches to technical problems when they found that the preferred strategies were not achieving the desired results (Table 24.3, 24.4, & 24.5). Implicit in this process was the participants' critical reflection on their own teaching strategies. The instructors learned not only teaching strategies through this process, but also learned means of identifying and learning alternative strategies through the informal learning process.

A key learning outcome cited by the instructors was developing flexibility and innovativeness in providing various approaches to subject matter and skill development to meet the various technical needs of their students (Table 24.7 & 25.7). They also indicated that they

had learned new ways to present material through trial and error as well as from other instructors during the early stages of their development as teachers. The outcome of the informal learning process of the participants had a transformative effect on them resulting in a new frame of reference guiding further instructional responsibilities and learning episodes (Table 24.8 & 25.8).

*Social interaction problems.* The instructors indicated that the most difficult problems they had to respond to were social interaction problems with their students (Table 25). These were most frequently identified as a part of the process of assessing outcomes, considering lessons learned, and reframing the problem. This resulted in re-interpreting the trigger after failed attempts to resolve a technical skill or knowledge problem (Table 25.6, 25.7, & 25.8). Consistently, social interaction problems required approaches that were learned informally, explicitly or implicitly, by engaging the participants' prior experience before involvement in flight instruction (Table 25.4 & 25.5). With a failure to gain an appropriate response from the student, the instructor's interpretation of the problem was reframed as a social interaction problem (Table 25.2). The informal learning process followed by interpreting this new dimension of the original problem. This was embedded in the assessment of the lessons learned and reframing the problem (Table 25.7 & 25.8). By considering the events and behavior of the students in light of the instructors' social interaction experiences, aligned with sociocultural standards of the educational setting, the instructors moved to resolve the social interaction problems founded upon their personal frame of reference (Table 25.2).

The interpretation phase was complicated by the lack of clarity due to the variability and ill-structured nature of the problems that surfaced as social interaction problems. The instructors interpreted the behavior patterns of the students and considered the verbal and non-verbal

communications that they had perceived. Through such symbols, instructors gave meaning to these observations based on their own implicit and culturally defined knowledge of social interactions (Table 25.2). Therefore, such interpretations were highly subjective and dependent on the participants' frames of reference. Since the behavior anticipated by the participants of this study supported respect for the position of the teacher, and assumed an investment by students in their educational efforts in aviation, the participants often had to get past their own disbeliefs that such situations could occur in the instructional setting (Table 25.2).

At this juncture, the technical skill or knowledge problem was re-interpreted as a symptom of the deeper more salient issue of a social interaction problem (Table 25.7). The participants would cease to address the technical skill or knowledge problem, having determined that the social interaction problem must be resolved before continuing to address the technical skill or knowledge problem. In some cases, the participants attempted to ignore the social interaction problem continuing to work on the technical skill or knowledge problem, but usually without success. In almost all cases, a choice to address a social interaction problem was coupled with anxiety and uncertainty for the instructors because the situation conflicted with their frame of reference and identity as teachers.

In some cases, considering alternate solutions was preempted by an intuitive response by the instructor. Such instances included participants responding intuitively by making a statement or taking an action at the spur of the moment (Table 25.5). Examples were the early termination of a lesson by Peggy, the rejecting of a student's request by José, and Lisa's direct confrontation to address a social interaction problem without conscious predetermined planning. Such measures usually followed after the instructor had attempted several unsuccessful less dramatic

approaches (Table 25.4, 25.5, & 25.6). In this process, the instructors moved from an evaluation of an intervention to a re-interpretation and proceeded to the implementation of another approach by-passing other phases of the model learning on the fly (Table 25.6, 25.7, 25.2, & 25.5).

Another approach to learning utilized by the instructors in an effort of find a workable strategy was to seek advice or support from other instructors. Resources the participants identified were both peers as well as senior instructors in an effort to find and learn potential approaches to rectify the social interaction problem (Table 25.3 & 25.4). Through such efforts, the instructors considered various ideas about the problem and identified possible solutions, informally learning novel approaches to social interaction problems, as well as gaining support from other teachers (Table 25.4).

After implementing an approach to social interaction problems the instructors engaged in an assessment of the outcomes of the intervention and re-evaluated the resulting behavior of students (Table 25.6). Results were sometimes evident immediately to the instructor. However, on occasion this phase would take the form of a prolonged testing period in which the student was on implicit probation while rebuilding the trust of the instructor. The assessment yielded one of two outcomes. First, the intervention was considered successful as the student responded positively to the intervention (Table 25.6). A positive outcome allowed the instructor to return to addressing the technical skill or knowledge problem and to move the student forward in the program. A second result was that the intervention had been unsuccessful indicated by continued poor student behavior (Table 25.6). In this case, the participants returned to considering and learning alternative strategies to address the problem.

Some problems did not get resolved within the time constraints of the semester. This resulted in following the student into the next semester and on to the next instructor. In either case, unsuccessful interventions came with adverse emotional by-products for the instructors such as frustration, anger, confusion, uncertainty, and discouragement. Both the successful and unsuccessful interventions were embedded in an informal learning process which resulted in a transformation of the participants' frames of reference. These transformed frames of reference became a filter for future engagements in the work place and elsewhere (Table 25.8).

***Explicit and implicit informal learning outcomes.*** Technical skill or knowledge and social interaction problem resolutions yielded both explicit and implicit learning for the instructors as a part of the lessons learned phase of the informal learning model (Table 24.7 & 25.7). When asked what they would do differently, or what they had learned, the participants responded how they would deal differently with time management, represented new ideas about teaching techniques, identified a change in understanding the relational issues between the instructor and the students. They also indicated they would become more prompt in responding to the social interaction problems that surfaced. Jack for instance, indicated, "...I will handle the attitudes differently..." and that he recognized more fully the need to be flexible and able to "...move on to the next one [approach]..." Others indicated that, reflecting on the experience of teaching, particularly with social interaction problems, they had learned to be more firm or confrontational with their students. These examples provided evidence of the explicit informal learning of these instructors.

The participants remarked that in some cases they had not realized the change that they had undergone as a part of facilitating their students' learning until they engaged in the reflective

process of the research project. Therefore, it is likely that participants had implicitly developed tacit levels of learning which were interwoven in the development of their frames of reference (Table 24.8 & 25.8). Some implicit learning was surfaced during the interview process through the reflective, retrospective engagement of the instructors with the events of their early teaching experience. Shiloh, Lisa, Katherine, and Diñez all explicitly referred to “...looking back...” on events as reformatinal to their understanding of the experience.

In summary, the participants engaged in a cyclical, non-sequential informal learning process that was influenced by their frames of reference, and triggered by the various problems they encountered in facilitating their students’ learning. The participants employed learning strategies that included informal conversations, collaboration, experimentation and trial and error to address their own learning in an effort to facilitate their students’ learning needs. Often several of these strategies were utilized through the various iterations of a single problem scenario. Outcomes of the process may or may not have resolved student learning problems, nevertheless, the instructors experienced transformative learning.

**Illustrating the non-sequential process of informal learning.** Based upon the findings of this study, the instructors’ process of informal learning demonstrated variations in complexity. The most direct process was illustrated by Peggy in which there was a more linear path from the trigger to reframing in which she by-passed phases three and four as depicted in figure 24.

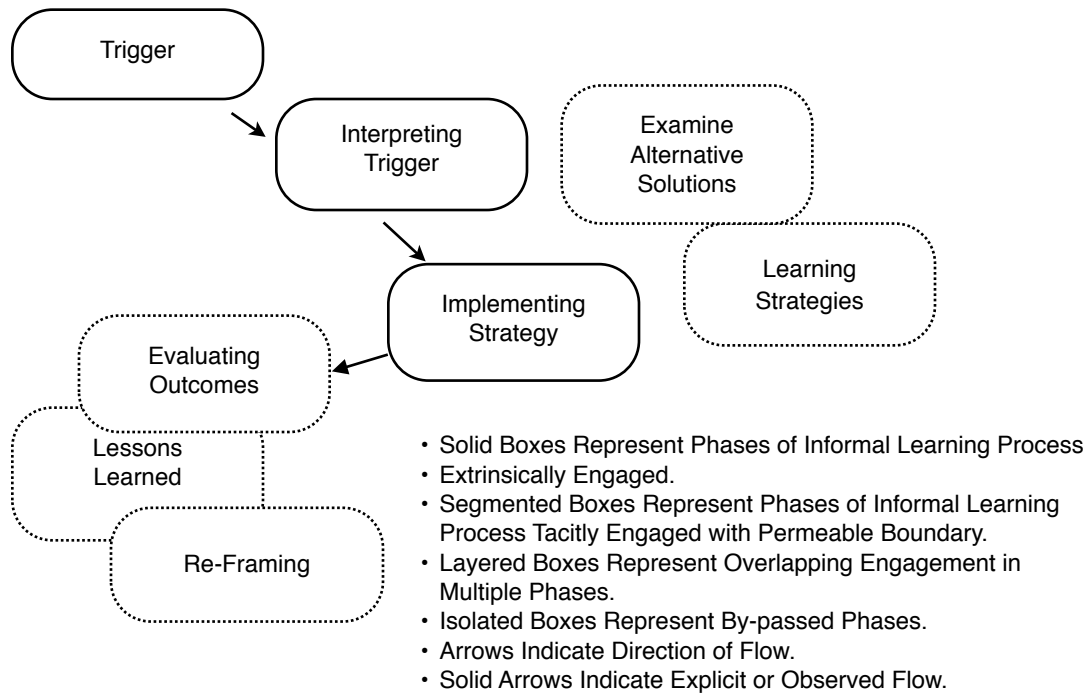


Figure 24. Informal Learning Process Map-a.

In several other cases the process required additional attempts to address a situation and spawned additional learning in the process as depicted in figure 25.



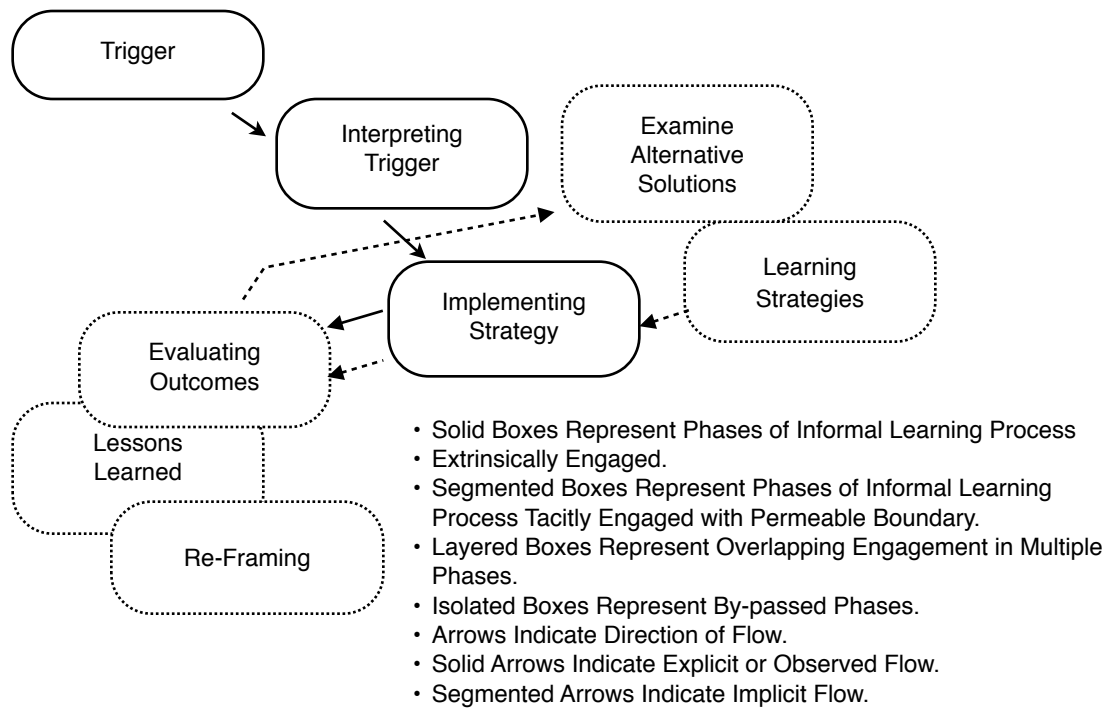
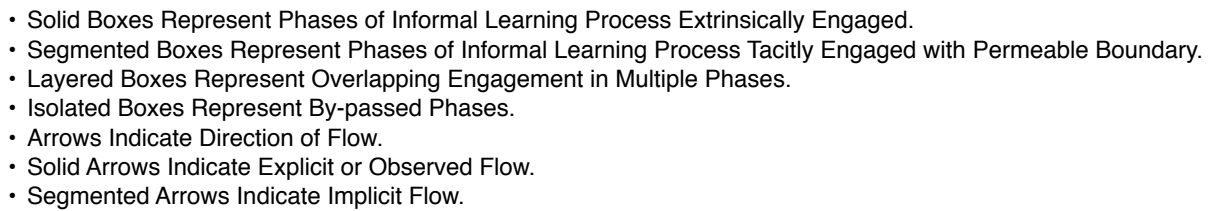


Figure 25. Informal Learning Process Map-b.

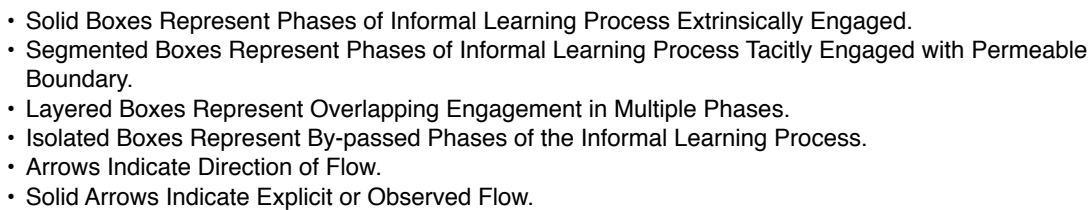
More frequently, across the instructors, the informal learning process was much more complex. As the problem became more complex and ill-structured, the learning process also increased in complexity in a co-evolutionary process. Jack illustrated one case which required several iterations and re-interpretation of the trigger as in figure 26. These characteristics were more evident when a social interaction problem complicated the informal learning process.



represented in this re-conceptualization by the segmented lines and overlapping representation of some of the phases. There was often a blur of situations, interpretations, implementations, and evaluations coupled with a constantly changing framework for making sense of the situation as demonstrated by the instructors.

It was also observed that, as the instructors encountered a trigger, the process might require several iterations of trial and error to clarify the core source of the problem. This was particularly evident with social interaction problems. As a part of this iterative process, a regression to previous phases was illustrated by the participants as they learned their way through the various problems. This feature is represented with by-directional arrows indicating that progression was stepwise and sporadic, rather than linear and sequential as the participants moved in any direction and by-passed phases of the model (Figure 27).

Some scholars may consider that repeating interpretation or returning to assessing alternative solutions may be a point of commencing with a new informal learning process with the failed attempt becoming a trigger for the informal learning process. This would be consistent with an observation at the phase level of the informal learning model. However, when considering the entirety of a specific problem biography, and the informal learning throughout the process to successful resolution or abandonment, one gains a vantage point from which to examine the influence of frames of reference on the informal learning process. Such an approach also facilitated the examination of the influence of informal learning on the development of the participants' frames of reference. Regardless of whether the outcome was successful or unsuccessful, the participants formed a new or adjusted frame of reference to filter future experience.



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This conceptual map (Figure 27) illustrates the complexity of the informal learning process observed in this study. It was evident that the participants engaged in informal learning in the workplace, and that this process was influenced by their frames of reference.

### **Frames of Reference and Informal Learning**

Through the examination of the problem profiles several factors may be noted concerning the relationship of the participants' frames of reference and their informal learning process situated in this aviation training setting. The participants illustrated how they interpreted and responded to situations based on their own experience and expectations, framed in their own beliefs and value structures, stimulated by the various problems they met with as a part of their early instructing experience. This illuminated the nature of the problems potentially acting as both a trigger to the informal learning process and as a contextual factor that influenced their ongoing process of informal learning. The participants' frames of reference influenced each phase of the informal learning process, facilitating understanding and fostering a response to the situation.

As the informal learning process provided an avenue to ascertain, learn, develop, and implement new teaching strategies to address the learning problems of their students, it also effected a transformational process for the participants. As the participants encountered challenges, particularly social interaction problems, their frames of reference of the meaning and responsibility of being a teacher were transformed. In some cases, the participants learned to be more firm as Diñez and Shiloh, or recognized that they suffered decreased motivation as Katherine, or that, as Lisa and Jack, that they must become confrontational with some student behaviors.

Participants expressed and demonstrated different value structures to the vocation of teaching as a result of informal learning. They acknowledged that teaching was a fulfillment of a milestone in the process of their own career development, to some degree for different reasons. Participants provided a sense of focused intent on teaching as a part of their career development and most expressed an intrinsic satisfaction in the interaction with their students' learning. For José this intrinsic value was a new and an unexpected outcome of engaging with his first student. Such intrinsic motivation and interest in their students provided clear outlines of deeply held values which were framed by their beliefs about teaching.

### **Chapter Summary**

This chapter presented the cross case analysis regarding the development and influence of frames of reference on the informal learning process of the ten instructors participating in this study. It has been shown, that through the social and cultural environment, the instructors' close engagement with parents, peers, teachers, and the influence of travel facilitating engagement with others, their values and beliefs, perceptions, understandings, approaches, and responsibilities, have been shaped in the web of their own sociocultural environments. Integral to this development was the fostering of frames of reference of the social milieu and workplace environment. These frames of reference enabled the instructors to make meaning of events and situations they encountered in the workplace. Based on their frames of reference, the participants engaged in the informal learning process interpreting and responding to the problem situations in the workplace while transforming their frames of reference from which to engage future experience. The influence of the participants' frames of reference was evidenced in their interpretation of the situations and in other phases of the informal learning process. Further, as

evidenced by the findings, the informal learning process experienced by these participants was non-linear and not necessarily sequential. The next chapter will discuss the finding relative to the existing literature as well as provide conclusions and implications for practice and future research.

## **Chapter 6**

### **Discussion, Conclusions, and Implications for Practice and Future Research**

The purpose of this study was to examine the influence of frames of reference on the informal learning process. Marsick, Watkins, Callahan, and Volpe's (2006) Informal and Incidental Learning Model served as the theoretical framework that guided this study. A qualitative instrumental case study design was used for this study to gain a deeper understanding of the influence of frames of reference on the informal learning process through in-depth study of this phenomenon (Stake, 1995, 2006). The participants of this study consisted of ten newly certified flight instructors engaged in their early teaching experience in an aviation flight training setting. The data for this study were collected through observation, document review, and semi-structured interviews. The participants provided biographical accounts to illuminate the development of their frames of reference and retrospective reports of the problems and challenges they encountered during their early experience of teaching in the aviation education setting that catalyzed their informal learning (Eraut, 2004). The data were initially reduced through a thematic analysis and were categorized, coded, and aligned with predetermined categories drawn from the existing literature on development and informal learning. Additional categories were developed when themes emerged that did not fit into predetermined categories. Constant comparative analysis was used within and across categories to provide clarity and facilitate the identification of emergent categories from the data. This approach allowed for the examination of the influence of frames of reference on the informal learning process in context inclusive of cultural, social, physical, and historical facets of the participants (Cseh, Watkins & Marsick, 1999; Cole, 1996; Jurasaitė-Harbinson, 2009; Marsick, 2009; Wertsch, 1990).



Marsick (2009) has acknowledged that, since informal learning is often implicit and hard to identify, a sociocultural lens may more easily allow the examination of informal learning by examining “the interaction of people and their social, historical and cultural context (p. 273).” In this study, individual frames of reference were examined, along with informal learning, through a sociocultural lens by aligning the biographical accounts and problem histories of the participants with the informal learning process (Hodkinson & Hodkinson, 2003; Marsick, 2009; Marsick et al., 2006). This study illuminated the participants’ development of frames of reference and their engagement in informal learning in this unique workplace setting. The findings of this study illustrated the non-linear cyclical nature of informal learning through the descriptions provided by the participants. Further, this study noted the catalyzing aspects of the problems faced by the participants during their early teaching experience. The findings of this study illuminated the influence of frames of reference on the informal learning process while illustrating the reciprocal influence of informal learning on the frames of reference of these participants. Additionally, several specific contextual influences of the informal learning process were identified. Finally, the findings of this study identified the integral position of frames of reference to the informal learning process.

This chapter summarizes the main findings of this study and first considers the development of frames of reference, followed by situating informal learning in the workplace in relationship to the implications of this study. A discussion of the contextual factors influencing the informal learning of the participants are presented. As a part of informal learning, this chapter will illustrate the non-linear nature of informal learning and discuss the catalyzing effect of the student problems as triggers for the informal learning of these aviation flight instructors in

their efforts to facilitate the learning of their students. The reciprocally influential co-constructive process of frames of reference and informal learning is then discussed. Then, based on the findings of this study, a reconceptualization of the informal learning model, inclusive of frames of reference, is articulated. Following this, a comparative summary of the existing literature and the findings of this study are then presented. Finally, participants' reflections and an articulation of the limitations of the study are presented along with recommendations for practice and future research based on the findings of this study.

### **Frame of Reference Development**

As the participants unveiled the development of their frames of reference through biographical accounts, common themes were found which corresponded to the literature on frames of reference. The influence of parents, culture, peers, teachers, educational and work experiences was evident through the participants' accounts as they shared the impact of these factors in shaping their frames of reference (Cole, 1996; Hoekstra et al., 2009; Lave & Wenger, 1991; Rogoff, 2003; Merriam & Mohamed, 2000). Their frame of reference development fostered a professional identity for the participants as flight instructors and shaped their expectations and beliefs about teaching (McNally et al. 2009; Owen, 2009). These factors were interwoven into the lived experience of the participants and shaped their interpretation and response to novel situations and events in the workplace (Dewey, 1938; Jarvis, 2006; McNally et al. 2009; Mezirow, 2000; Taylor, 2008; Vygotsky, 1978).

### **Situating Informal Learning**

**Contextual factors influencing informal learning.** Scholars have indicated that informal learning is a part of daily experience and that it is socially constructed and contextually

embedded (Ellinger & Cseh, 2007; Hoekstra et al. 2009; Lohman, 2006; Marsick, 2009). The aviation educational setting provided both a context that situated the lived experience of the participants in the workplace and provided social engagement through the students, instructors and colleagues, from which the participants employed and transformed their frames of reference and learned teaching strategies (Marsick, 2009; Mezirow, 2000; Owen, 2009). This setting was complicated by the urgency of the flight training environment which requires timely responses by an instructor to rapidly changing situations encountered during flight training. As these participants engaged in the daily workplace activity of teaching they encountered challenges in facilitating their students' learning which prompted their own informal learning as instructors (Marsick, 2009; Owen, 2009).

**The non-linear nature of informal learning.** Consistent with the work of Marsick et al. (2006), upon encountering a teaching difficulty in the workplace, these instructors engaged in an informal learning process (Lohman & Woolf, 2001). These challenges triggered the informal learning process as a part of the participants' problem solving process while attempting to facilitate the learning of their students (Ellinger, 2005; Hoekstra et al., 2009; Jurasaitė-Harbinson, 2009; Marsick 2009). It has been acknowledged that informal learning is often difficult to describe, often tacit or implicit, and is resistant to detection (Marsick, 2009). However, it has been noted that informal learning may be surfaced through reflection (Eraut, 2004; Gola, 2009; Gray, 2006; Marsick, 2009; McNally et al., 2009). Through the retrospective, reflective accounts of the participants' experiences with these problem-solving episodes, their informal learning processes were articulated and opened to exploration by the participants themselves as well as the researcher (Gray, 2006; McNally et al., 2009).

Scholars have indicated that though the informal learning model is represented as linear and sequential, it may be more accurately conceived as being a non-sequential, non-linear, and cyclical process (Marsick, 2009; Marsick & Watkins, 1990). However, examining informal learning as non-sequential and non-linear has received limited attention in the literature. As these instructors engaged in the process of informal learning, the process was often extended through several iterations. In some cases this was because the instructors' selected teaching strategy was unsuccessful in resolving the learning problem of their students. In other cases, the initial interpretation of the situation proved faulty requiring continued informal learning by the participants to reframe the problem and facilitate their students' learning. As nuances of the problem solving process impeded a resolution, the participants would move about the informal learning process, by-passing phases and regressing to earlier phases, to learn alternative solutions as a part of reframing the experience. The complexity of the problem contributed to the need for repeating phases of the informal learning process in an effort for instructors to learn their way through the process, developing a solution to a problem in a co-evolutionary process (Eraut, 2004; Marsick, 2009; Marsick & Watkins, 1990).

**Student problems as a trigger to flight instructors' informal learning.** Marsick (2009) has indicated that some individuals are highly motivated to learn to improve the condition or situation of their work environment. This was certainly the case of the participants in this study. As instructors, they engaged in informal learning to resolve situations and facilitate the learning of their students. In concert with the existing literature the informal learning process began with a trigger (Marsick & Watkins, 1990). Unique to this particular study is that the flight instructors' informal learning was triggered by students' problems with learning (Lohman &

Woolf, 2001; Owen, 2009). In examining the various problems that these participants faced as a part of their teaching, two categories of problems emerged. The first problem category was identified as a Technical Skill or Knowledge Problem. This category was characteristic of problems in which a student displayed a problem with an operational task of flying an aircraft, or a difficulty in understanding one of the cognitive requirements of the aviation discipline. Such deficiencies have been identified in prior research as serving as a catalyst for informal learning (Ellinger, 2003; Jurasaitė-Harbinson, 2009; Lohman & Woolf, 2001; Marsick & Watkins, 1999).

It has been acknowledged that individuals bring a repertoire of embedded strategies gained in past histories in work and elsewhere to an experience (Ellinger & Cseh, 2007; Ruth-Sahd & Tisdell, 2007). Further, scholars have suggested that organizations and professions embrace certain cultural norms which influence the learning of individuals in such organizations (Cseh & Ellinger, 2007; Owen, 2009). For example, Owen (2009) found that perceived professional norms influenced the teaching strategy selection of instructors in air traffic control training. Both the embedded strategies, from participants' histories, and professional cultural normative attitudes contributed to the participants' engagement in informal learning and problem solving with technical or knowledge problems.

The participants of this study adopted routine teaching strategies through the aviation training culture as a part of their learning as students. When encountering technical skill or knowledge problems, the participants tended to initially rely on teaching strategies which they had developed as students during their own training which was illustrative of their non-reflective learning (Jarvis, 2006). Having used a specific technique or strategy that was effective for them as students fostered an expectation that similar successful outcomes would result for their

students (Dewey, 1938; Jarvis, 2006; Owen, 2009). Technical skill or knowledge problems tended to be well defined, though often challenging to resolve because of the complex nature of aviation education and flight training. On occasion, the participants found that a preferred approach was ineffective in developing their students' skill or knowledge. When this occurred, the participants would engage in additional informal learning to learn and develop alternative teaching strategies to address the situation (Lohman, 2006; Marsick, 2009; Marsick & Watkins, 1990). Scholars have identified various strategies for informal learning such as experimenting, collaboration with various learning partners, informal conversation, trial and error and reflecting on one's own practice (Ellinger & Cseh, 2007; Hoekstra et al., 2009; Koopmans et al., 2006; Lohman, 2006; Marsick, 2009). Each of these strategies were used by the participants of this study as they engaged in informal learning. The participants of this study engaged in seeking guidance and expertise from more experienced colleagues. This reflected the nature of an apprenticeship model as becoming a participant in the aviation community as the instructors had informal conversations and collaborated with more experienced instructors to move toward mastery in the field (Lave & Wenger, 1991, McNally et al., 2009; Owen, 2009; Rogoff, 2003).

A second category of problems faced by the instructors was identified as a *Social Interaction Problem*. This category was identified as the product of the affective domain involving a variance in the feelings, beliefs, values, goals, and attitudes of the students in contrast or conflict with those of the flight instructor. The literature on informal learning provides little reference to such problems. Often, resources suggested for addressing such problems by existing flight instructor training materials tended to be prescriptive and lacked the depth to address the variation of the problems faced by these participants. Social interaction

problems tended to be ill-structured with variations of situations, students, and conditions (Eraut, 2004; Jonassen, 2000; Lohman, 2006; Marsick, 2009). Korte (2009) has remarked that when organizational roles are ill-defined individuals must negotiate and clarify their roles through interaction in a social [interaction] context. As these participants engaged in social interaction problems, they often demonstrated an interpretation and strategy selection based on the filter of their frames of reference. Often, strategies were implemented from a domain other than aviation founded on an implicit belief in the similarity of the situation. In the absence of a similar situation as a part of the participants' frames of reference, the participants resorted to experimentation or an innovative approach to make sense of the situation and to address the problem. Again, strategies for learning to address these challenges corresponded to other studies on informal learning including experimentation, informal conversations, collaboration with other instructors, or through reflecting their own practice and situation (Hoekstra et al., 2009; Jurasaitė-Harbinson, 2009; Koopmans et al., 2006; Lohman, 2006; Poell et al., 2006). This response by the participants demonstrated the nature of meaning and understanding being socially constructed as a part of an individual social, cultural, and historical heritage as an interwoven aspect of individual development (Cole, 1996; Evans & Kersh, 2004; Hodkinson & Hodkinson, 2003; Jurasaitė-Harbinson, 2009; Koopmans et al., 2006; Lohman, 2006; Marsick, 2009; Poell et al., 2006; Rogoff, 2003; Vygotsky, 1974; Wertsch, 1990).

In resolving or developing an understanding of the situation or problem, the participants were engaged in several iterations of the informal learning process while attempting to reach a resolution. This was particularly evident in this ill-structured problem solving situation. This activity corresponded with the parallel tracks of the problem and solutions spaces that Dorst and

Cross (2001) have referred to in the design problem solving process. Dorst and Cross (2001) have indicated that an individual moves between a problem space and the solving space toward a resolution to a problem. This is in concert with the participant's illumination of the non-sequential, non-linear, cyclical process of informal learning as they addressed a student learning problem.

This process reflected Mezirow's (2000) transformative learning framework in which the participants' foundational beliefs or values were challenged resulting in a change of their frames of reference. This transformation, through the process of learning and development, influenced the framing of future engagements with social interaction problems and teaching for the participants of this study (Lave & Wenger, 1991; Hoekstra et al. 2009; Lewin, 1974; Marsick, 2009; Mezirow, 2000).

**Sociocultural development and informal learning.** Vygotsky (1978) has viewed individual development along four lines which he identified as ontogenetic, phylogenetic, sociocultural, and microgenetic. Ontogenetic development reflects the gradual change an individual undergoes, such as thinking or behavior over a span or time, such as a life span or throughout childhood. Phylogenetic development is the slowly changing aspect of the human species thereby leaving a legacy for subsequent generations. Sociocultural development is the social landscape that is a part of an individual's development which furnishes tools and technology used in social interaction and meaning making such as language and discourse. Finally, microgenetic development is the moment to moment learning and development that occurs in an individuals' engagement with lived experience founded on the phylogenetic and sociocultural backdrop of nature and nurture contributing to one's ontogenetic development



(Rogoff, 1990; Vygotsky, 1974). This research study considered each experience a factor in the development of the participants' frames of reference as a socially constructed filter by which they interpreted and engaged in situational meaning making and problem solving as a part of lived experience. The findings of this study supported a view of the informal learning process as co-evolving with the problem solving and meaning making process of the participants (Cseh, 1998; Marsick, 2009; Marsick & Watkins, 1990; McNally et al., 2009).

Marsick (2009) has indicated that individuals bring themselves into the learning situation and because of this their strategies are mediated by their beliefs and values. These beliefs and values are the product of the sociocultural development of the individual which become his or her habits of mind and points of view forming frames of reference (Mezirow, 2000, Marsick et al., 1999). When examining informal learning, it is necessary to recognize the sociocultural factors that contribute to the participants' frames of reference as they engage with a situation or event (Hodkinson & Hodkinson, 2003; Marsick, 2009). As these participants encountered a technical skill or knowledge problem, they tended to initiate a teaching approach that had facilitated their learning as students. This selection was based on participants interpreting, implicitly or explicitly, that the students' deficiencies corresponded to the instructors' experiences as students. Having framed students' deficiencies as a *perceived common experience*, that is, like their own experience as students, the instructors expected that a similar approach would resolve their students' needs as well. When the approach resolved a deficiency, the problem framing approach was reinforced as a suitable means to address such problems. When it became evident that the approach had been unsuccessful, the participants re-interpreted the situation and/or resorted to an alternative approach as a part of an informal or incidental

learning process and microgenetic development (Rogoff, 1990; Marsick & Watkins, 1990; Marsick et al., 2006; McNally et al., 2009; Vygotsky, 1974).

When engaged with a social interaction problem the participants were faced with a situation in which both understanding and interpretation were beyond the narrow perimeters of aviation flight instructor training. This left the novice instructors with few structural supports to understand and address the situation. This required them to develop strategies through other resources, learning informally in the process. The participants' frames of reference about acceptable behavior for teaching, learning, and the educational setting, founded on their sociocultural development, became a resource for interpreting and responding to the social interaction problems (Cole, 1996; Korte, 2009). The participants often were unsuccessful in the first or second attempts to resolve some of these problems. Complex problems often required several iterations of interpretation, selection, implementation, and evaluation as an evolutionary process of both problem solving and informal learning as a part of microgenetic development (Cole, 1996; Dorst, 2001; Eraut, 2004; Lave & Wenger, 1991; Marsick & Watkins, 1990). The sociocultural development of the flight instructors' frames of referenced were interwoven with informal learning through the problem situations presented in facilitating their students' learning and resolving social interaction issues.

### **Frames of Reference and Informal Learning**

In both technical skill and knowledge problems and social interaction problems, the participants' frames of reference influenced their interpretation and the selection of their approach to the problem and their learning (Owen, 2009). The participants' frames of reference influenced the informal learning process while the informal learning process transformed the

participants' frames of reference. Interpretation, strategy selection, and evaluation of the outcomes of an intervention were influenced by the participants' frames of reference. The transformation of the participants' frames of reference were facilitated through the evaluation and lessons learned phases, ultimately reframing the situation, and forming an altered frame of reference as indicated in Table 27. Table 27 delineates the informal learning process phase in the left column aligned with the frame of reference activity in the right column as the participants utilized existing frames of reference (FOR-U) or experienced transformation of their frames of reference (FOR-F/T).

Table 27

*Frame of reference and informal learning*

Informal Learning Phase	Frame of Reference Activity
Trigger	A catalyst which instigates the informal learning process.
Interpretation	Utilizing existing frames of reference (FOR-U).
Assessing Strategies	Utilizing existing frames of reference (FOR-U).
Learning Strategies	Utilizing and transforming existing frames of reference (FOR-U, FOR-F).
Implementation	Utilizing existing frames of reference (FOR-U).
Evaluation of outcomes	Utilizing existing frames of reference (FOR-U).
Lessons learned	Transforming existing frames of reference (FOR-F/T).
Framing	Transforming existing frames of reference (FOR-F/T).

Frames of reference both influenced the informal learning process and were influenced by the learning process which is characteristic of microgenetic and sociocultural development (Jurasaitė-Harbinson, 2009; Rogoff, 1990; 2003; Vygotsky, 1978). As such, frames of reference

contributed to informal learning and development, and subsequently these participants' frames of reference were transformed through informal learning. This reciprocal interaction is an important factor in developing a holistic understanding of informal learning and professional development.

**Considerations regarding the informal learning model.** Considering holistically the sociocultural development of individuals by factoring in their frames of reference suggests that a reconsideration of terminology of Marsick, Watkins, Callahan, and Volpe's (2006), Informal and Incidental Learning Process Model is suitable. Particularly "Framing the Business Context" and the implication of the model situated in "Context".

In the 1990 edition of Marsick and Watkins seminal work, *Informal and Incidental Learning in the Workplace*, the current phase identified as Framing the Business Context was cast as "Problem Framing" (p. 224). This was a derivative from an earlier model called the learning loop which was a compilation of Simon's three stages of un-programmed activity and Schön's model of experienced based learning (in Marsick & Watkins, 1990). This phase identified what was needed to "assess the results of an intervention or the impact of non-interventions" providing a setting for a problem (Marsick & Watkins, 1990, p. 224). This phase was considered to be a final phase fitting at the end of an informal or incidental learning process. The model utilized Problem Framing to indicate that the phase expressed one's framing the problem retrospectively as an outcome of the informal learning process.

In 1997, the final the phase of the model received the title, "Frame the Experience." This again suggested its retrospective development for one's understanding of future experiences as a frame of reference for situating "the problem-solving cycle" (p. 296) as being "embedded within

a sub-surface cycle comprising the beliefs, values, and assumptions that guide action at each stage” (p. 296). This corresponds to Mezirow’s (2000) articulation of a frame of reference as the filter by which one processes sensory inputs. Further, Marsick and Watkins (1997) indicated that there was a need to integrate the influence of past learning into the model as a reflective or transformative aspect of learning. The inclusion of reflective and transformative aspect of learning adds emphasis to the notion that the informal learning process is a dynamic process of change and reformation of one’s frame of reference as the lens for additional sensory experience (Dewey, 1937; Jarvis, 2006; Kolb, 1984; Marsick & Watkins, 1997; Mezirow, 2000; Taylor, 2008).

Marsick, Watkins, and Cseh (1999) re-conceptualized the model to present a more explicit representation of the Context of the environment throughout the informal learning process. At this time, the final phase of the model was re-titled Framing the Business Context (p. 352) and the model was embedded in a backdrop of Context. The latter reference to Context was used as a descriptive term specifying environmental factors that were a part of the sociocultural and geographic area of the time and place associated with Cseh’s research study. Framing the Business Context was identified as a “new category” and was defined as the “constraints and opportunities perceived by the participants in the context in which they operated (p. 352).” This re-conceptualization seems to have narrowed the prior implications of “Framing,” as well as incorporated the ambiguity of the terms such as context, framing, and perception. This focus has narrowly limited the lens to the “Business Context” implicitly excluding or de-emphasizing other influences which shape, form, and mold one’s frame of reference. With this description, the utility of the model and the scope of factors that influence informal learning may have been

limited. Nevertheless, it is extremely important to give recognition to the place of Context as permeating every phase of the informal or incidental learning process.

Two issues emerge at this juncture. First, Context is recognized as an important aspect of informal and incidental learning, but Context has been identified as a term with less than explicit definition requiring a more precise description (Ellinger, 2005; Ellinger & Cseh, 2007 & Marsick, 2009). If researchers and practitioners are to fully understand the implications of context to informal learning more clarity is needed about its meaning (Ellinger, 2005; Ellinger & Cseh 2007; Cseh et al. 1999; Marsick, 2009; Marsick & Watkins, 2001). Second, the re-categorization of Framing the Business Context has somewhat limited the scope of the model while potentially adding confusion as the model is embedded in Context.

Marsick, Volpe, and Watkins (1999) reaffirmed the idea of the extensive influence of Context as integrated in every step of the process of informal learning. They also provided some clarity to the concept of Context as the lens (p. 87) through which the managers in Cseh's study saw their world, thus providing a frame of reference to respond to the "critical incidents" and "learning experiences" (p. 87) which these managers encountered. Context was further identified as triggers, barriers, and opportunities which provided additional ambiguity (Marsick et al., 1999).

There appear to be two uses of the word context in both location and meaning at this juncture. First, the manager's preconceived understanding, beliefs, and conception of his or her world, which was identified as a "lens" or "way of seeing" (p. 87). This is what Mezirow (2000) has identified as Frame of Reference, or the sensory filters by which individuals make sense of the episodes and events of lived experience. The second use of context is that of the present

environment in which the learner engages with all the changing capacity of the environment that permeates the learning experience.

Marsick, Volpe, and Watkins (1999) mentioned the idea of transformational learning and the significance of frames of reference by acknowledging a conception beyond a Business Context. They indicated that framing is; “psychological, political, social, cultural, economic, or epistemological” (p. 93). Further, they indicated that one’s frame of reference influenced the choices and decisions one makes. One may consider then that Framing the Business Context undermines the inclusive capacity of the informal and incidental learning model to extend beyond the business context, and does not fully express the prominence of an individual's frame of reference in the process of informal or incidental learning.

More recently Marsick, Watkins, Callahan, and Volpe (2006) raised consideration of tacit/implicit learning and knowing stating that, “through tacit learning we construct the mental, emotional, and interpersonal frameworks for processing all of our experience into knowledge (p. 3).” Further, whole person learning is advocated by a more comprehensive approach, inclusive of the interwoven individual aspects of one’s informal learning through this study's sociocultural lens (Jurasaitė-Harbison, 2009, Marsick, 2009). This places one's individual frame of reference as a mediator to the phases of the informal learning model, set within and a part of Context.

Context may be described in four specific aspects as presented by the experience of the participants of this study. These include problem variation, organizational factors, organizational culture, and frames of reference. Scholars have identified organizational factors and organizational culture as significant contextual factors which influence the informal learning of individuals in the workplace (Ellinger, 2005; Ellinger & Cseh, 2007; Jurasaitė-Harbison, 2009;

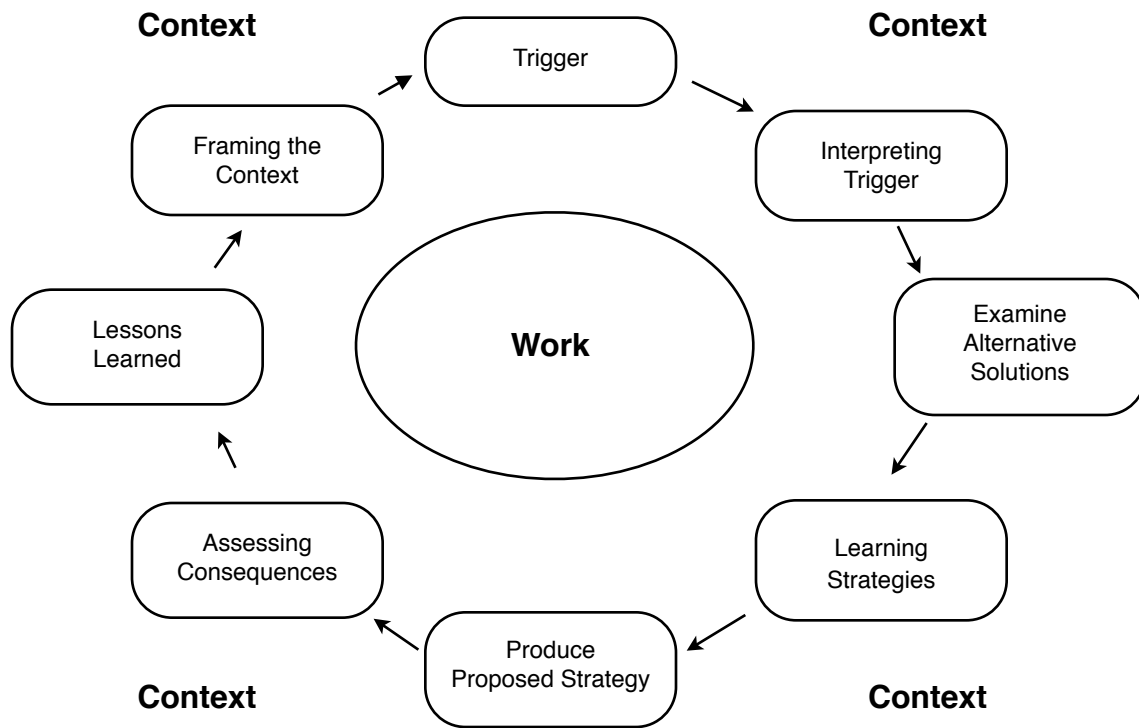
Lohman, 2006; Owen, 2009). Problems and challenges have been recognized as catalysts to the informal learning process as individuals attempt to resolve problems and improve their working situations (Ellinger, 2005; Marsick, 2009; Marsick & Watkins, 1990; Marsick et al., 2006). In this study it was evident that problem variation acted as both a catalyst and as a contextual element (Marsick et al., 1999). As context characteristically influences the nature of informal learning so did the problem variation expressed by the participants of this study highly influence the process of informal learning, particularly as they engaged with social interaction problems (Korte, 2009; Marsick, 2009).

Problem variation, organizational factors, and organizational culture represent context which are external to the individual and often outside his or her control. However, each external contextual factor was filtered through the lens of the individuals' frames of reference influencing their informal learning (Jarvis, 2006; Hoekstra et al., 2009; Marsick, 2009; Mezirow, 2000; Owen, 2009). These frames of reference were internal and unique to the individuals, providing a unique engagement with other contextual factors and with the informal learning process. This effect was demonstrated by the participants of this study as they framed the situations and events according to their beliefs, values, and meaning structures, which comprised the instructors' frames of reference throughout their informal learning (Jurasaitė-Harbison, 2009; McNally, 2009).

**Frames of reference and the informal learning model.** The findings of this study draw attention to a broader examination of the influence of frames of reference as a dynamic transformational process through informal learning. An revision of Marsick, Watkins, Callahan, and Volpe's (2006), Informal and Incidental Learning Process Model may facilitate greater utility



of the informal learning model and provide clarity by extending the boundaries of informal learning to the whole experience of the individual. Figure 28 depicts the informal learning model embedded in context with “work” centrally located. Though this model has been supported as demonstrating the process of informal learning, considering the experiences articulated by these participants, this model fails to capture the prominence of frames of reference. Though these participants were involved in the workplace setting and engaged in the informal learning process, their frames of reference became a filter for understanding the context, inclusive of the workplace, which represented only one domain in which their frames of reference were shaped and exerted influence. Central to informal learning are frames of reference and it is necessary to connect the influence of frames of reference to each phase of the informal learning process.



*Figure 28.* Informal and Incidental Learning Model (Marsick, Watkins, Callahan, & Volpe, 2006).

Figure 29 suggests alterations to the Informal and Incidental Learning Model supported by the findings of this study (Marsick et al., 2006). This revised model was informed by the informal learning process of participants viewed through a sociocultural lens as they described the interwoven nature of their frames of reference with the process of informal learning (Marsick, 2009).

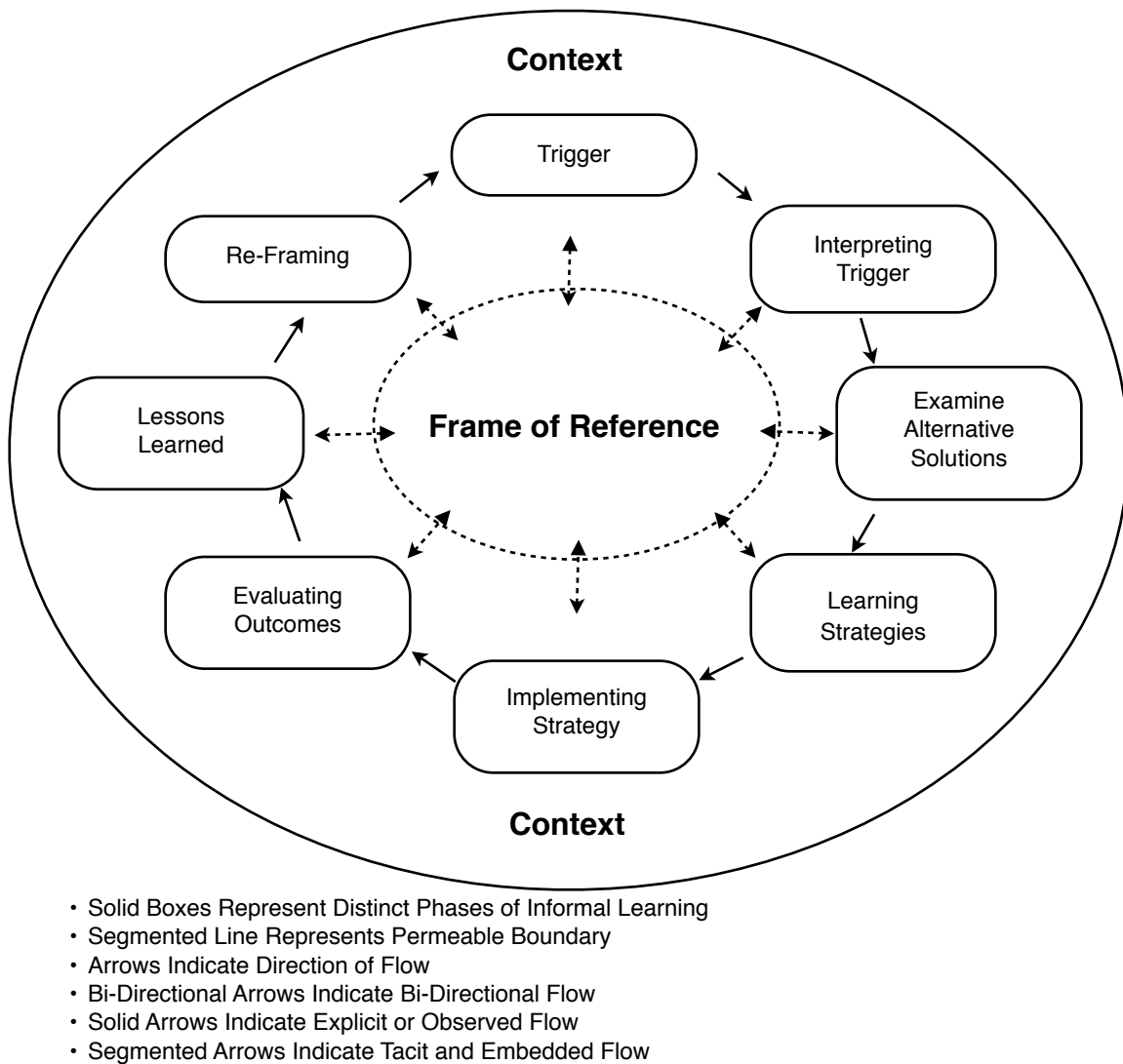


Figure 29. Revised Informal and Incidental Learning Model.

In this revised conceptual model, the Informal and Incidental Learning Process is embedded in *context* which is filtered by the individual's *frames of reference*. Within the domains of context and frame of reference, work, as well as other domains of one's lived-experience, are embedded both influencing and being influenced by one's frame of reference. Relocating context and frame of reference in this way provides an articulation of the entire context of an environment, physically, individually, historically, politically, and socially. These sociocultural facets are interwoven in the informal learning process inclusive of the whole person

(Cole, 1996; Jurasaitė-Harbison, 2009; Rogoff, 2003; Marsick, 2009; Marsick et al., 2006; Wertsch, 1990).

The overall process of informal learning as articulated in the Marsick et al. (2006) Model was supported by this study. It was observed that the participants encountered a trigger in the workplace which resulted in their engagement in an informal learning process (Marsick & Watkins, 1990; Marsick et al., 2006). However, the interaction of participants' frames of reference with the various phases of the informal learning process displayed a dynamic nature in which the participants' frames of reference influenced the informal learning process while the informal learning process influenced the participants' frames of reference (Eraut, 2004; McNally et al., 2009; Taylor, 2008). The participants' frames of reference specifically influenced the interpretation, selection, action, and meaning making phases of the informal learning process. Reciprocally, the participants' frames of reference were influenced dynamically through the informal learning process. The informal learning process transformed the participants' frames of reference through the phases of evaluating outcomes, lessons learned, and reframing. To give expression to this dynamic interplay, the bi-directional connecting arrows indicate the interaction between the phases of participants' informal learning process and the participants' frames of reference.

In some cases, the interaction between a phase of the informal learning process with the participants' frames of reference was not explicit or observable at the time of the study. Scholars have indicated informal learning is often tacit or implicit and though unobservable, it provides core knowledge and value to both the individual and to organizations (Eraut, 2004; Evans & Kersh, 2004; Gola, 2009; Jarvis, 2006; Marsick, 2009; McNally et al., 2009; Nonaka, 1994;

Polanyi, 1964). To give expression to place of tacit and embedded learning the connecting arrows are constructed with segmented lines between frame of reference and the phases of examine alternative solutions, learning strategies, and lessons learned.

Although scholars have indicated that informal learning is not linear in nature, the findings from this study illustrate that the phases of the informal learning process were not necessarily addressed sequentially (Marsick, 2009; Marsick & Watkins, 1990). In some cases, certain phases were omitted in reconstructions of the participant's informal learning process. The final phase of the process, retitled "Reframing," reflects the dynamic nature of the process as interwoven with the individuals' "Frames of Reference." This alteration provides clarity by contrasting the reframing of the learning experience with the individuals' frames of reference as a filter to the informal learning process set in the overarching backdrop of context. This also supports the transformation of frames of reference through the informal learning process (Hoekstra et al., 2009; Marsick et al., 1999; McNally et al., 2009; Mezirow, 2000; Taylor, 2008).

As a truly dynamic process, the outcome of the informal learning and the backdrop of the informal learning process are mutually constructive of each other. That is, participants' frames of reference interprets the learning environment as the learning experience transforms their frame of reference. The participants of this study reframed the problem, learned teaching strategies, and transformed themselves as teachers through informal learning. The cognitive, affective, and psycho-motor nuances, which were integrated into the participants' frame of reference, were transformed through informal learning as a co-evolutionary learning and developmental process.

Table 28 provides a comparative summary presentation of the themes relevant to this study aligned with existing literature coupled with the findings of this study which extend or provide new insights to these themes.

Table 28

*Comparative Summary*

Themes	Existing Literature	Findings of this Study
Frame of Reference Development	Existing literature provides an indication of the various contributors to one's frame of reference development through family, culture, social interaction, and learning (Cole, 1996; Marsick, 2009; Rogoff, 2003).	This study highlights the influence of learning through workplace situations and problems as a contributor to frames of reference while supporting professional identity development.
Situating Informal Learning		
Contextual Factors	It has been acknowledged and demonstrated that informal learning is a part of daily experience and situated in specific context of the workplace including organizational factors and culture (Ellinger, 2005; Lohman & Woolf, 2001; Marsick, 2009).	This study has supported the nature of informal leaning as embedded in the daily experience of individuals and concurs with the findings of investigations of teachers' unique work place environment. It was noted that frames of reference acted as a contextual factor influencing informal learning.
Process of Informal Learning	It has been remarked that the informal learning model appears to be sequential and linear, that it appears to be a cognitive process to the disregard of socially constructed nature of informal learning (Marsick, 2009).	This study illustrates the non-linear character of the process of informal learning as the participant repeat and by-pass various phases of the informal learning process.  This study demonstrated the social construction of the informal learning process through the collaboration and interaction of the various agents including students and colleagues.
Triggers to Informal Learning	Problems and opportunities in the workplace have been shown to act as triggers to the informal learning process (Ellinger & Cseh, 2007; Marsick, 2009).	This study highlight the evidence of the various problems that the instructors faced acted as triggers to the informal learning process.  This study has especially shown that the social interaction problems are a unique trigger and significant situational construct.

(continued)

Table 28 (continued)

Themes	Existing Literature	Findings of this Study
Informal Learning Strategies	<p>Experimenting, collaboration, informal conversation, trial and error and reflecting on one's own practice have been acknowledged as informal learning strategies (Lohman, 2006; Poell et al., 2006).</p> <p>Much of the learning that occurs in the workplace is characterized as tacit or implicit and difficult to identify or explicate (Eraut, 2004; Marsick, 2009).</p>	<p>This study found that informal learning strategies previously identified in various fields were supported by the descriptions of the participants of this study in this unique field.</p> <p>Particularly salient for the participants of this study were experimentation, trial and error, and collaboration.</p> <p>The explication of tacit knowledge and intuitive response to situations and problems encountered in the workplace illuminate an aspect of the influence of frames of reference as a significant factor in the informal learning process.</p>
Relationship of Frames of Reference and Informal Learning	<p>Scholars have acknowledged that individuals are a part of the learning process and that one's past experience situate learning (Dewey, 1938, Eraut, 2004; Marsick, 2009).</p>	<p>The findings of this study illuminate the social construction of informal learning.</p> <p>The findings of this study explicate the influence of frames of reference on informal learning while illuminating the transformation of frames of reference through informal learning as co-evolutionary process of learning and development.</p>
Informal Learning Model	<p>Marsick, Watkins, Callahan, and Volpe's (2006) Informal and Incidental Learning Model provides a framework for understanding and exploring the informal learning process of individuals.</p>	<p>The findings of this study support a reconceptualization of this model that articulates the influence of frames of reference on informal learning while demonstrating the transformative nature of informal learning on one's frames of reference.</p>

## Conclusions

The findings of this study support the following conclusions:

- (a) Frames of reference influenced the informal learning process of the participants of this study.
- (b) Informal learning transformed the participants' frames of reference through the development of altered or new frames of reference.

- (c) Problem variations acted as a trigger for informal learning, particularly when problems were ill-structured and in an unstable environment.
- (d) Informal learning is not easily recognized as learning and is often embedded in tacit or implicit knowledge.
- (e) Informal learning is influenced by the affective domain while informal learning stimulates affective responses for some engaged in the informal learning process.
- (f) Though often depicted as linear and sequential the informal learning process has been demonstrated to be non-linear, non-sequential, and cyclical in nature.
- (g) This study extended the notion of context to include frame of reference as an influential factor in the informal learning process. Therefore, alteration to the existing Marsick et al. (2006) informal learning model to reflect the centrality of frames of reference was developed.

The findings of this study emphasize the centrality of the influence of frames of reference on the informal learning process of individuals. As the participants engaged in the informal learning process, each phase was influenced by their frames of reference shaping how they interpreted and engaged with the various phases. While frames of reference influenced the informal learning process, the informal learning process transformed the participants' frames of reference in a co-constructive process of learning and frame of reference development.

The study highlighted the catalyzing aspects of the problems faced by the participants during their early teaching experience. Facilitating the students' learning acted as a trigger for instructors' informal learning. As the students manifested a learning problem the instructors



were required to engage in an informal learning process in an effort to learn new approaches and methods to address the students' learning problems.

This study has highlighted the influence of problem variation, especially social interaction problems in the workplace. Problem variation increased the instability of the workplace and triggered greater urgency and need for informal learning. The variation of problems, technical skill and social interaction, also influenced the context of the informal learning environment. As problems in this workplace varied they added to the contextual complexity of the environment. This added to the instability of the workplace which required increased informal learning activity by the instructors.

It was evident that through the research process, particularly during the interviews, the participants met challenges to their understanding of the event and their responses that stimulated a reflective process. This reflection frequently surfaced embedded frames of reference and knowledge that was the unrecognized product of an informal learning process. These became illuminating experiences that elevated the awareness of the participants and fostered a richer understanding of the events of their early instructor experience.

On several occasions the participants indicated that, through this research study, they had engaged in a reflective process that surfaced issues and brought to mind concepts that they had not considered previously. One such instance was the comment of Katherine that she had not considered the help she had given to her peers as facilitating their learning but now understood that it was consistent with her framework of teaching. Sam and Shiloh also indicated that they had come to understand the events that they had experienced with their students and their responses to the challenges differently and more fully through the process of reflection

stimulated by the research process. As the participants responded to the biographical and problem profile reports they often indicated that they had been able to understand the challenges that they had encountered in a new way by which the activity of member checking provided both affirmation and insight to their understanding. As a reflective exercise this illuminated the embedded learning gleaned through informal learning as a novice flight instructor.

The process of informal learning was often accompanied by affective elements such as delight, satisfaction, disbelief, shock, and frustration. As the participants were challenged by the transformative process of learning it destabilized their preconceived notions along with the context and fostered anxiety. In other cases an affective response to an event or situation became the catalyst for an informal learning process episode in learning how to respond to the situation.

This study has extended the explication of the notion of context and has situated individual frames of reference such that our explanation of informal learning is more expressive of the whole person inclusive of one's physical, social, cultural, and historical experience through a sociocultural lens (Marsick, 2009).

Finally, based on the findings of this study a reconceptualization of the informal learning model, integrating the relationship of frames of reference to informal learning, has been articulated. The informal learning process, though typically represented graphically as sequential and linear, is actually non-sequential, non-linear, and cyclical in nature. As the participants engaged in the informal learning process they passed over various phases, engaged in several phases at the same time, and consistently repeated various phases of the informal learning process ultimately reframing and assimilating the process into an altered or new frame of reference.

As an aviation professional, this researcher was not unaffected by the engagement in this research process. Engaging with these new flight instructors I found that I also engaged in an informal learning process and experienced the explication of my own frames of reference through the reflective process of gathering and analyzing data collected from the participants. I realized that assumptions that I held as an experienced aviation instructor were challenged resulting in a change in teaching strategies and interactions with colleagues and students. I have moved to a more collaborative environment that is interested in the framing and understandings of my students and colleagues. It has changed my style of communication with my students desiring to honor the depth of their personal experience, assist them in explicating assumptions that impede their learning, and provide an open system that allows change rather than a rigid style. I find that being interested and becoming knowledgeable about my students, subordinates, and colleagues stories elevate my understanding of them and facilitates better approaches to the learning and management environment. This has the effect of fostering open effective relationships and facilitates organizational value alignment within a university setting.

### **Limitations**

Despite the rich data provided through the participants' descriptions, this research study has certain limitations that should be acknowledged. The relatively small purposefully selected participant sample precludes the generalizability of the results beyond this particular population and setting. Further, the participants of this study were all solely engaged in the field of aviation. This raises the question of how informal learning may be influenced by frames of reference of individuals who are situated within and influenced by other occupational settings. The participants of this study were all college educated, enrolled in, and graduated from the same

undergraduate program, often taught by the same instructors. Further, the participants were all under the age of 30 and predominantly representative of a majority population. This provided a limited observation of cultural factors that may affect frame of reference development, and the influence of frames of reference on the informal learning process beyond these cultural characteristics.

### **Implications for Practice and Recommendations for Future Research**

**Practice.** Human resource development (HRD) professionals, leaders, managers, teachers, and administrators may benefit from the findings of this study through the illumination of the variety of problems and problem structures faced by individuals in the workplace. With the more easily defined technical skill and knowledge problems, participants tended to rely on strategies that they had the opportunity to participate in as students. The ill-structured nature of social interaction problems compelled the participants to engage in collaboration or an experimental or trial and error approach in an attempt to resolve the teaching problem as well as facilitate their own learning.

Marsick (2009) has acknowledged that informal learning often appears as a cognitive construction, not accurately representing the social interaction aspect of informal learning as manifested in the collaboration, informal conversations, and sharing strategies of teachers (Ellinger & Cseh, 2007; Hoekstra et al., 2009; Lohman, 2006; Marsick, 2009; Poell et al., 2006). In both informal learning and problem solving, the participants collaborated and consulted with others in their learning process. The instructors utilized the suggestions and shared materials of other instructors with continued efforts to understand an event or situation and to find a workable resolution. This collaboration and the utilization of informal learning spaces supports efforts for

developing mentoring programs and facilitating networking in the workplace to explicate individual frames of reference (Lohman, 2006).

Providing learning spaces that facilitate collaborative approaches and promote informal learning may enable organizational members to address both the well-structured and the ill-structured problems (Gray, 2007; Hoekstra et al., 2009; Jurasaitė-Harbison, 2009; Lohman, 2006; Marsick, 2009; McNally et al., 2009). Through such approaches, value may be added to organizations through dissemination of informal learning more broadly, and by collaboratively addressing complex problems. It is also possible that within the aviation context, additional training on social interaction problems may be developed and implemented within the curriculum to provide tools to meet the challenges of aviation instructors and facilitate student learning.

Value alignment is paramount in achieving a highly effective workplace (Billett, Ovens, Clemans, & Seddon, 2007; Senge, 2006). In considering the development and influence of frames of reference, the embedded unexamined structures highlighted through this study such as implicit knowledge and tacitly held frames of reference, need to be surfaced and examined. Tacit or embedded knowledge has been identified as an asset to organizations, but often requires surfacing to be deployed (Evans & Kersh, 2004; Gola, 2009; Marsick, 2009; McNally et al., 2009). This study found that participants possessed embedded knowledge acquired through their formal learning as students and informal learning as instructors. This embedded knowledge was unreflectively held, yet was acted upon by the participants. Such unreflectively held knowledge may provide faulty frames of reference, adversely influencing informal learning and behavioral outcomes (Jarvis, 2006; Marsick et al., 1999; Owen, 2009).

To surface, align, and leverage frames of reference, there is a need to foster trust, open communications, opportunities to engage in reflective practices, both individually and in collaboration with others. Organizational members must learn to listen to the stories of others and be open to articulating and sharing their own stories. This practice may illustrate frame of reference development and locate or situate members of the organization in the setting while learning about others respectfully. Practitioners might consider various venues, means, and opportunities that encourage reflection to surface embedded knowledge and make that knowledge explicit and evident to individuals (Lohman, 2006; Marsick, 2009; McNally et al., 2009). Exploration of biographies and problem narratives has been demonstrated to be an effective means to surface and examine frames of reference in this study. From such narratives, storytelling, and reflective conversations, one may begin a transformational learning process to encourage value identification and alignment, to leverage learning for individuals, and groups, and effect performance improvement for the organization (Gray, 2007; Marsick, 2009; Marsick et al., 1999; Mezirow, 2000).

Additionally, Ellinger (2005) and Ellinger and Cseh (2007) have identified several positive organizational contextual factors influencing informal learning that were supported by the findings of this study of aviation instructors. The organizational culture of this study supported and recognized the value of informal learning as demonstrated through leadership modeling and through formal and informal supports. The organization demonstrated a commitment to informal learning through the provision of supports for new teachers in aviation education by promoting collaboration and information exchange among colleagues (Korte, 2009; Lohman, 2006; Marsick, 2009; McNally et al., 2009). Such efforts are advocated for

practitioners to leverage informal learning for individual and organizational development. The importance of learning partners, (peers, colleagues, managers, and supervisors) has been recognized in the scholarly literature and in this study (Ellinger & Cseh, 2007; Eraut, 2007; Marsick, 2009). Organizations could benefit from these findings by encouraging and promoting these types of collaborative behaviors.

Finally, one key aspect highlighted by this study was the urgent nature of aviation flight instruction. Time to respond to situations and events color the nature of the complexity of the informal learning process and problem solving. This urgency of resolution is a cultural and organizational consideration (Billington & Billington, 2010). In training and teaching settings, the recognition and implications of the nature of urgency of the context must be considered. Placing time constraints on assignment and scenarios, problem based learning approaches could simulate the urgent nature often found in practice which would enhance the ability of novice practitioners to respond more appropriately in the informal learning environment.

**Future Research.** The participants in this study have demonstrated that they engaged in informal learning at work by making meaning of a situation and attempting to resolve a problem. Many of the actions taken by the participants can be attributed to their sociocultural development, experience, self discipline, and personal frames of reference of being a teacher (Hoekstra et al., 2009; Jurasaitė-Harbison, 2009; Marsick, 2009). An area that would benefit from further research and extend the study of informal learning would be to examine other learner populations with different needs or skills sets to examine the influence of individual frames of reference on the informal learning process. Additionally, flight instruction, as in most forms of teaching, is a highly social environment and therefore may require elevated interaction

as a part of the context. In further research it may be informative to examine settings which lend themselves to less social interaction and require more independent agency.

Participants in this study had been acculturated through the aviation education community as students and had imbued specific professional and organizational norms (Owen, 2009). These norms were recognized as a contributor to the development of the participants' frames of reference regarding aviation instruction and teaching. Therefore, additional studies would be valuable to investigate the replication of these influences in other settings or occupational fields. Also one may evaluate the positive and negative attributes of cultural norms in specific professions and organization with regard to informal learning.

During this study, it was noted that reframing through an informal learning process led to transformation of individual frames of reference. It may be that responses to triggers become more tacit and routine over time in the field, even in ill-structured situations. Therefore, given the dynamic nature of frames of reference, an investigation of how frames of reference change over time through experience in the field could inform the development of training models for the workplace for both novice and experienced professionals, particularly in aviation training. This study considered the learning of the teacher in an educational aviation education environment; however, it has been noted that limited attention has focused on teachers in facilitating their students' learning (Ellinger & Cseh, 2007; Hoekstra et al., 2009; Owen, 2009). Therefore, additional studies could explore the concepts of teachers as learners and as facilitators of their students' informal learning in various educational settings.

The urgent nature and immediate response required in the aviation training setting illuminates the need to consider the time and urgency in decision making, problem solving and



the informal learning that is associated with both as an important aspect of the context that situates the informal learning process. Therefore, further research that focuses on the nature of urgent settings such as aviation, emergency medical practice, emergency public services as well as other fields that have a context that has an urgent nature would be a rich resource to developing a more comprehensive of the influence of time to act requirements as an influence on the informal learning process.

Finally, one under examined aspect of interest observed in this study was the impact of affective elements associated with the informal learning process of these participants. Scholars have indicated that the emotional aspect of informal learning needs more research (Marsick, 2009; Marsick et al., 2006). Therefore, an exploration of the influence of the affective domain on informal learning is needed to more fully understand and leverage informal learning in the workplace.

## **Chapter Summary**

This chapter has summarized the finding of this study and has situated the findings in relationship to the existing literature. Additionally, this chapter has presented conclusions that include a re-conceptualization of the informal and incidental learning model to provide clarity and utility beyond the workplace, inclusive of the whole person by positioning frame of reference as central to the informal learning process. Finally, this chapter has presented implications for practice to more effectively leverage informal learning and ideas for future research to extend the literature base and knowledge of the influence of frames of reference on the informal process.

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## Appendix A.

### IRB Approval

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

Bureau of Educational Research  
College of Education  
38 Education Building  
1310 South Sixth St.,  
Champaign, IL 61820



November 24, 2009

Michael Wofford  
Institute of Aviation  
1 Airport Road  
MC-351

Dear Michael,

On behalf of the College of Education Human Subjects Committee, I have reviewed and approved the modifications to your research project originally entitled "Examining the Influence of Frames of Reference on the Process of Informal and Incidental Learning" and now entitled "Examining the Influence of Frames of Reference on Flight Instructors' Process of Informal Learning in an Aviation Training Setting". This project continues to meet the exemption criteria for federal regulation 46.10 I(b) I for research involving the use of normal educational procedures in an educational setting where the identity of the participant is protected. It also meets the exemption criteria for federal regulation 46.101(b)2 for research involving normal interview and observation techniques where the identity of the participant is protected.

No changes may be made to your procedures without prior Committee review and approval. You are also required to promptly notify the Committee of any problems that arise during the course of the research. Please don't hesitate to contact me with any questions.

Best regards,

Anne S. Robertson  
Coordinator, College of Education Human Subjects Review Committee

Cc: Dr. Andrea Ellinger

telephone 217-333-3023 • fax 217-244-0538

## Appendix B.

### Inquiry Model

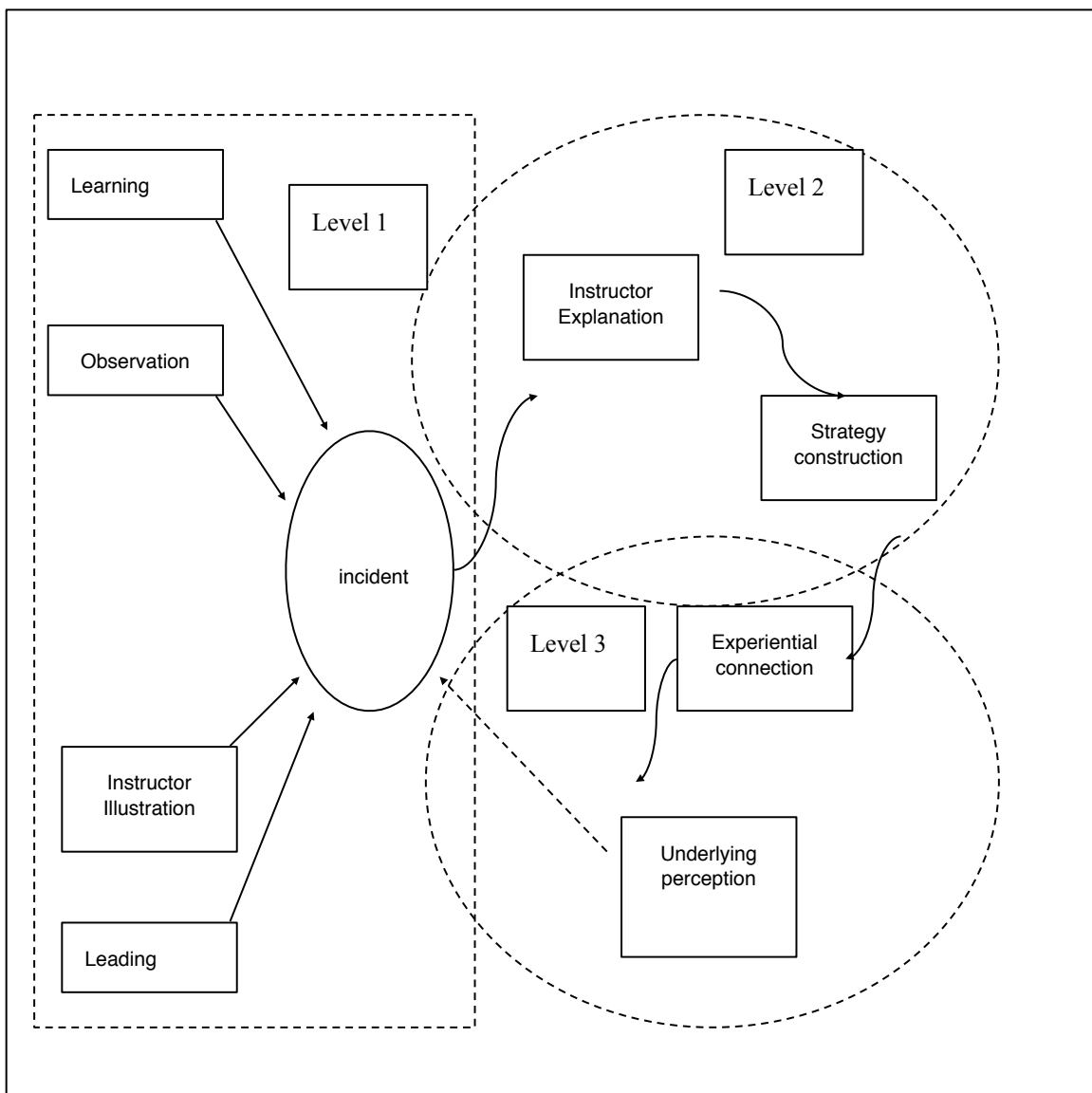


Figure B1. Three Level Inquiry Model: Wofford, 2006

Table B1

Three Level Inquiry

Level of Analysis	Information Description
Level I. Historical Narrative	Information was represented as the historical narrative of the engagement of an incident or instance that the participant encountered.
Level II. Cognitive/Experimental	Information based on previous experience and identification of these experience linkages. This represented the narrative of strategy development and construction of meaning for the participant when confronted by a non-routine engagement.
Level III. Awareness/ Consciousness	Information provided access to examining the participant's development of the frame of reference at the intersection with her or his informal learning. At this level, a frame of reference as illuminated through individual biography was connected to his or her informal learning process to examine the interaction.

## Appendix C.

### Learning Process Table

Table C1

*Learning Process Comparative Table*

Dewey	Lewin	Jarvis	Mezirow	Marsick & Watkins
Event/experience	Crisis event	Disjuncture	Disorienting Dilemma	Trigger
Restraint	Unfreezing		Critical reflection	Interpretation of Experience
Reflection		Reflection		Assessing Possible Solutions
Learning/intention	Movement		Discourse	Learning Strategies
			Action	Implementing Strategies
				Evaluation and consequences
Expectation/ Reframing	Refreezing	Reframing	Transformation /Reframing	Lessons learned/ Reframing
				Framing the context

**Appendix D.**  
**Interview Protocols**

**Biographical Information:**

Could you tell me about yourself, your family, what you have done?

Where are you from?

What was your family like?

What did you do growing up?

What do you consider significant events or activities that you have been a part of?

Coming to college:

Could you tell me about coming to the university?

How did you become interested in the university?

What did you do while a student in the university?

Where did you live while at the university?

Becoming a pilot:

How did you become introduced to aviation?

Why did you choose to become a pilot?

What was it like going through the aviation program?

What do you hope to do with your aviation education and becoming a pilot?

Becoming a teacher:

Tell me about becoming a flight instructor?

Why did you choose to become a flight instructor?

Tell me about your experience of becoming an instructor.

**Workplace experience information:**

Question associated with a situation identified in the learning journal:

I notice in your journal entry that you indicated that you and your student encountered an unusual situation that you had to resolve.

Level one Question: Could you tell me about that situation?

Level two Question: How did you resolve or come to understand the situation?

Level two Question: Why did you choose to use this particular approach  
' or Why did you think of the situation in this manner?

Level three Question: How was this situation connected or associated with this previous case?

Question associated with a situation identified through direct observation:

I noticed that you encountered an unusual situation instructing the other day when X - X. I'm interested in such situations and how we resolve them so I wondered if we could talk about this situation some time soon?

Level one Question: Could you tell me about that occasion, what happened?

Level two Question: How did you resolve or come to understand the situation?

Level two Question: Why did you choose to use this particular approach  
or, Why did you think of the situation in this manner?



Level three Question: How was this situation connected or associated with this previous case?

Questions of instructor - student experience:

Could you tell me a story about an unusual experience that you had teaching or working in the organization that caused you have to produce a solution or come to understand something differently?

Could you tell me about an instance or situation when you discovered that what you had expected as an instructor was not what you had actually encountered?

Level one Question: How did you resolve or come to understand the situation?

Level two Question: Why did you choose to use this particular approach or why did you think of the situation in this manner?

Level three Question: How was this situation connected of associated with this previous case?

## Appendix E.

### Audit Trail

Table E1

*Audit Trail*

Date	Activity
	<b>Preparation:</b>
5/09	IRB Approval
11/09	Submit Proposal
12/09	Preliminary Review
12/09-2/10	<b>Recruiting:</b> Learning journal review Identify informational situations and events. Invite participation and schedule interviews
	<b>Data Collection and Analysis:</b>
12/09-4/10	<b>Observation:</b> Facilities Environmental context Demographic issues Peer associations and involvement
1/10-2/10	<b>Archival Review:</b> Company records and policy review. Organizational structure Job descriptions Organizational supports for new employees. Formal communication channels and methods. Supplemental information for employees. Formal Training curriculum review.

(continued)

Table E1 (continued)

*Audit Trail*

Date	Activity
	<b>Interviews and Analysis</b>
12/09 -2/10	First interview series: Collect, transcribe, categorized, code and summarize first interview.
1/10 -4/10	Second interview: Member check transcript, categories and summery Continue data collection in interview Amend first interview in accordance with participants view and comments
2/10-4/10	Transcribe, categorized, code and summarize second interview data. Compare within and across categories for clarity.
3/10-4/10	Third interview: Member check transcript, categories and summery of previous interview Amend previous interview in accordance with participant's views and comments.
	<b>Synthesis, Analysis and Preliminary Report:</b>
2/10-4/10 - 2/10-5/10	Synthesize code to categories Compare data in and across categories to insure clarity and distinction.
1/10-5/10	Identify salient categories.
5/10-6/10 -	Prepare written report.
6/10-7/10	Member check report Make corrections Insert additions Amend report
	<b>Final Report:</b>
7/10-11/10	Prepare and Complete Final Report Editorial Review Revise Report Submit Final Report
12/10	Defense